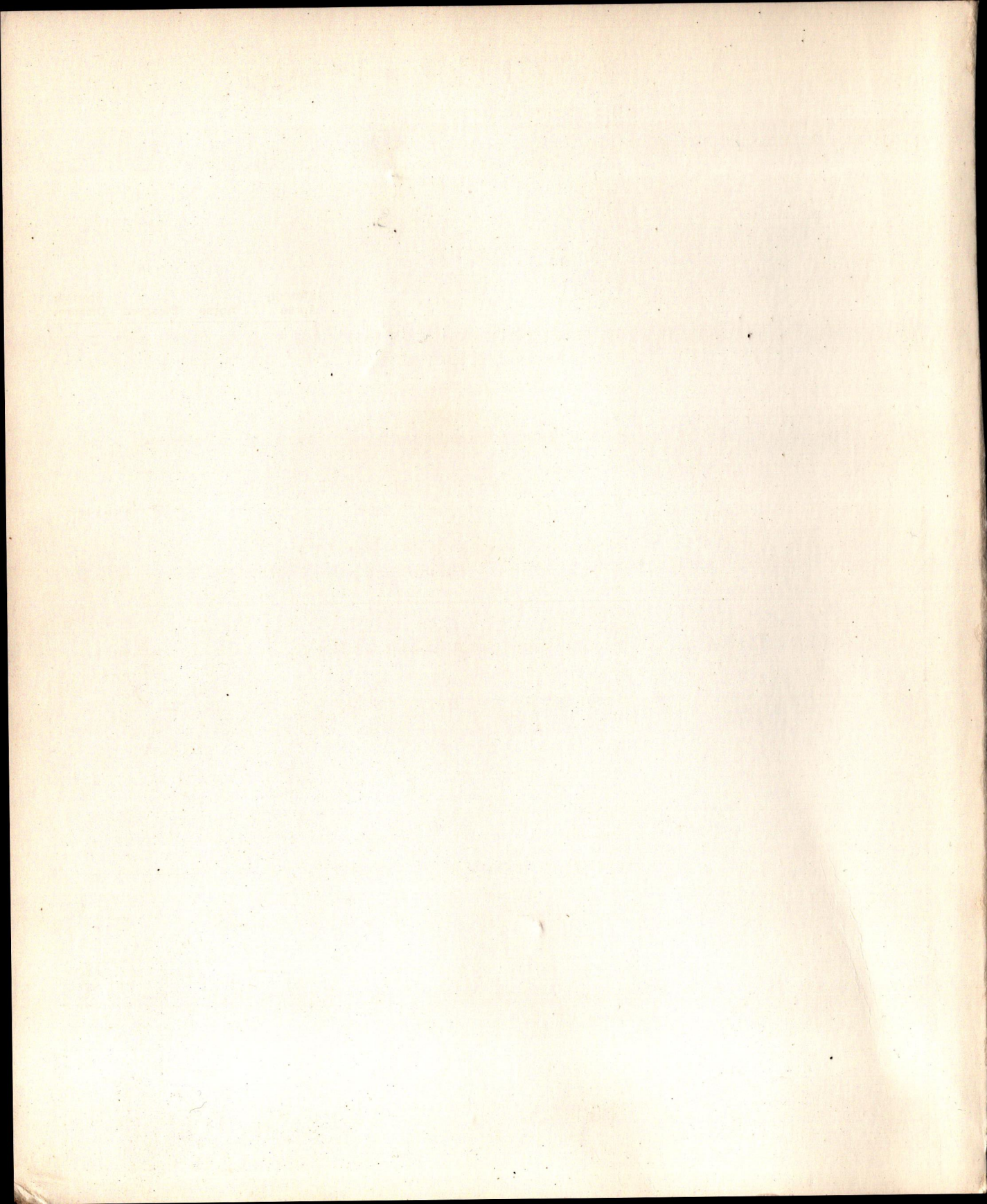


4693D Color Image Printer



Tektronix®
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4693D Color Printer User Manual

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User Manual

4693D Color Image Printer

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WARNING

This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the user manual, may cause interference to radio communications. Depending on the voltage configuration of your printer, this product has been tested to comply with the limits for FCC Class A or Class B computing devices. VDE 0871 Class B limits apply to 220V configured products. Refer to Appendix A, *Installation*, for proper installation and more complete information on radio and television interference prevention measures.

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For current revision information, see the *Change Information* page at the rear of this manual.

First printing September 1987
This printing March 1988

PN 070-6467-00

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Operators Safety Summary

Terms in this Manual

CAUTION statements identify conditions or practices that can result in damage to the equipment or other property.

WARNING statements identify conditions or practices that can result in personal injury or loss of life.

Terms as marked on Equipment

CAUTION indicates that a personal injury hazard exists that you cannot gain access to immediately. For instance, a panel may cover the area that is hazardous. **CAUTION** also applies to a hazard to property including the equipment itself.

DANGER indicates a personal injury hazard that you can gain access to immediately as you read the **DANGER** sign.

Symbols in this Manual



This symbol shows you the caution information that applies to a matching symbol that you found on the product.



Static-Sensitive Devices.

Symbols as marked on Equipment



DANGER high voltage.



Protective ground (earth) terminal.



Refer to the manual for caution information.

General Information

Power source. This product uses a power source that does not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A grounding connector in the power cord provides a protective ground connection that is essential for safe operation.

Grounding the product. The grounding conductor of the power cord grounds this product. To avoid electrical shock, be sure to plug the power cord into a properly wired receptacle before you connect the cord to the instrument.

A grounding connector in the power cord provides a protective ground connection that is essential for safe operation.

Danger arising from loss of ground. If the instrument loses the ground connection, all accessible conductive parts (such as knobs and controls that appear to be insulating) can cause an electric shock.

Use the proper power cord. Use only the power cord and connector that the instrument specifies.

Use only a power cord that is in good condition.

Refer changes that you wish to make to the cord or connector to a qualified service technician

Use the proper fuse. To avoid a fire hazard, use only the fuse that the instrument specifies. If you replace the fuse, make sure that replacement fuse is identical in type, voltage rating, and current rating to the old fuse.

When you replace the fuse, notify a qualified service technician.

Do not operate in explosive atmospheres. To avoid explosion, do not operate this product in an atmosphere of explosive gases unless it has been specifically certified for such operation.

Do not remove covers or panels. To avoid personal injury, do not remove the top covers. Do not operate the product without the covers and panels properly installed.

Introduction

Section 1

Introduction

The Tektronix 4693D Color Image Printer produces high quality fast prints using a thermal wax printing process. It can print pictures of screen images or data files from host computers, terminal display screens, graphic work stations, IBM-compatible AT personal computers, and rasterizers.

About this Manual

This manual explains how to operate the 4693D Color Image Printer. You will need no special training; refer to this manual for information.

The *FOR THE USER* sections give operating instructions: Section 1 has general information about the printer. Section 2 tells you how to prepare for printing screen images. Section 3 explains how to print, load media, and do other everyday operating procedures. Section 4 contains information about simple maintenance and minor troubleshooting.

The *APPENDICES* contain reference information and details about less frequently used printer operations.

Terms in this Manual

This book may contain unfamiliar terms, which are defined in Appendix J, *Glossary Of Terms*. Refer to this glossary when needed.

Other Documentation

Aside from this manual, the printer comes with the 4693D Quick Reference Booklet. This booklet can be attached to the printer, providing a brief guide to common printer operating procedures. You can also order the 4693 Series Service Manual for service information, and a 4693D-Tektronix Parallel Interface Support Software Development Guide to aid a programmer in writing a program for driving the 4693D. (See Appendices for part numbers and ordering information.)

Unpacking and Installing the 4693D

See Appendix A.

Main Features of the 4693D

The 4693D Color Image Printer has a thermal wax print engine and a high-speed digital color data communication interface. It completely offloads image data from source devices in less than three seconds, freeing graphic systems for other use, and prints images at a resolution of 300 dots per inch.

The 4693D features include:

- Prints images in 8 color, a full range of up to 16 million dithered colors, black and white, or 256 shades of grey.
- Scales images to maximum print size to compensate for varying screen resolutions.
- Can invert saturated black/white or indexed colors.
- Orients images in Landscape or Portrait format.
- Matches printed colors to terminal screen colors.
- Prints on American or metric media.
- Varies pixel width to compensate for differences in shape which exist between the screen area and the printed area.

The 4693D is capable of printing images from both Tektronix and non-Tektronix hosts, and can be used in a multiplexed environment, providing up to four users with real-time service. Each of the four ports can be configured with independent printing and imaging parameters for maximum user flexibility.

You can set printing and imaging parameters to tailor images to particular applications using the printer's front panel and terminal hard copy commands.

Compatible Terminals

The 4693D Color Image Printer is compatible with Tektronix 4100, and 4200, 4220, and 4230 Series Terminals, the Tektronix 4120 Color Graphics Workstations, Tektronix 6130 and 4132 Intelligent Graphics Workstations, and the Tektronix 4510, 4510A, CX4510A Color Graphics Rasterizers,

In addition, the printer can accept data from any non-Tektronix host that communicates with a parallel interface, including IBM compatible AT type personal computers. The printer is also compatible with Apple Macintosh II computers when installed with a 4690F44 Printer Interface Kit for the Macintosh II. It also can be used with SUN and Apollo Color Workstations that have IKON interface boards. In all cases, data must be sent in a format the printer can understand.

Compatible Tektronix terminals have a varying number of commands that control hard copies depending on their individual drivers.

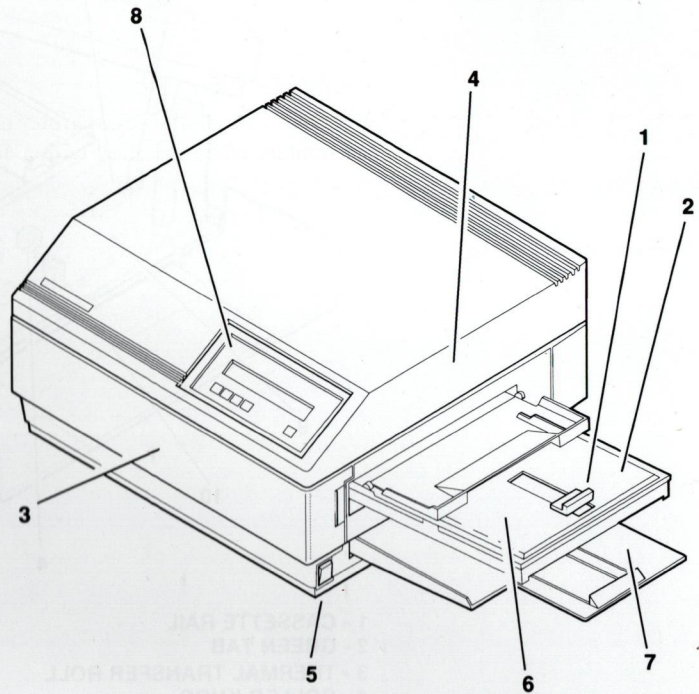
Parts

Figure 1-1 and 1-2 show the basic external and internal parts of the 4693D Color Image Printer. You may want to refer to these figures when following the instructions for installing, powering up, and maintaining the printer.

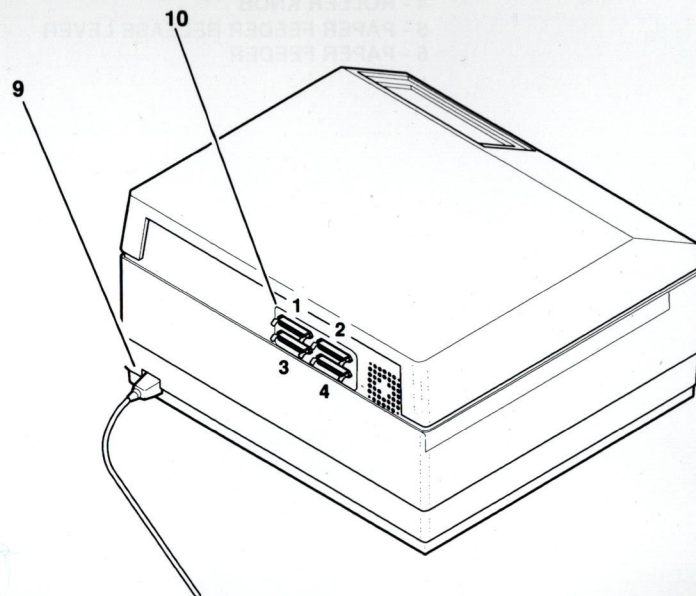
- 1 - MEDIA SELECT LEVER
- 2 - CASSETTE COVER
- 3 - FRONT COVER
- 4 - UPPER HALF
- 5 - POWER SWITCH

- 6 - PAPER CASSETTE
- 7 - COPY RECEIVING TRAY
- 8 - FRONT PANEL
- 9 - POWER CORD
- 10 - PARALLEL INTERFACE PORT CONNECTORS

Figure 1-1. External Parts of the Printer.

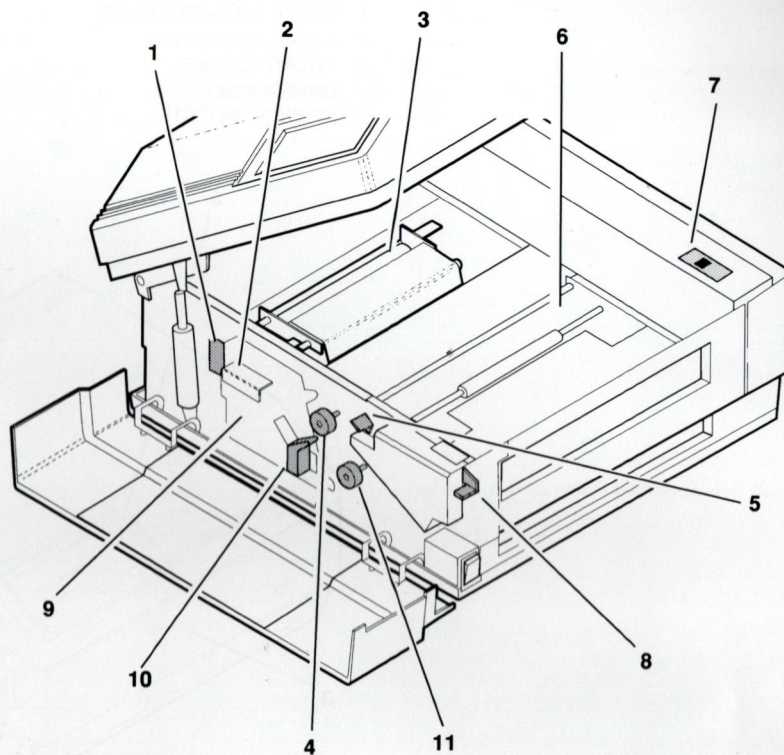


6467-100



6467-101

Figure 1-2. Internal Parts of the Printer.



- 1 - CASSETTE RAIL
- 2 - GREEN TAB
- 3 - THERMAL TRANSFER ROLL
- 4 - ROLLER KNOB
- 5 - PAPER FEEDER RELEASE LEVER
- 6 - PAPER FEEDER

- 7 - VOLTAGE SELECTION SWITCH
- 8 - UPPER-HALF RELEASE LEVER
- 9 - TRANSFER ROLL CASSETTE
- 10 - CASSETTE RELEASE LEVER
- 11 - DRUM KNOB

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Section 2

Preparing to make a print

Preparing to make a print

This section explains how to prepare a screen image for printing on the printer. It includes a general explanation about the terminal and printer setup procedures needed to print an image with some specific information about configuring Tektronix terminals to work with the 4693D.

The printer setup instructions explain how to use the front panel to set the printer up and describe some of the commonly used front panel settings. However, it does not include complete information about all of the parameters on the printer's front panel; for a detailed explanation of the front panel settings, see Appendix B, *Front Panel Windows*.

It also describes briefly how to print a test picture, but it does not have details about making prints. For a complete explanation about making prints, see Section 3, *Operating Instructions*. Refer to Appendix J, *Glossary of Terms*, for definitions of unfamiliar terms.

General Overview

To create hard copies of images displayed on your terminal screen, you must first set up communications between the terminal and the printer. Additionally, you can tailor your hard copies for specific applications by setting imaging and printing parameters. These parameters can be set at the printer; some can be set at the terminal.

Setting Up Communications for Printing

Each terminal has its individual procedures for setting up communications with the printer. Details about configuring Tektronix terminals are explained in this section. For information about configuring non-Tektronix terminals, refer to hard copy commands documented in the terminal's programmers reference manual.

Configuring a Tektronix Terminal

Configure the Tektronix terminal using the terminal hard copy commands. The HCINTERFACE command is required in order to send the data correctly to the printer. Enter HCINTERFACE as shown below:

- For 4100 Series, 4200 Series, and 4111 Terminals, enter

HCINTERFACE 1

- For 4110 and 4120 Series Terminals, enter:

HCINTERFACE COLOR

- For 4220 and 4230 Series Terminals, enter:

HCINTERFACE 2

NOTE *You must also set the INTERFACE COMPATIBILITY window on the printer's front panel to "Tektronix 4692 printer" if you are connecting anything other than the 4200 or 4230 Series Terminals.*

In addition to the HCINTERFACE command, other terminal hard copy commands may be used to set optional imaging and printing parameters. Each type of terminal will have a varying number of terminal hard copy commands.

Setting Up Printing and Imaging Parameters

You can set parameters to tailor your printed picture at both the printer and at the terminal. This topic explains how to select parameters by using the printer front panel; then, in brief, by using terminal's hard copy commands.

Some parameters are only available on the printer, and some are only available on the terminal. For many applications, you may only need to set parameters at the printer, or at the terminal, but not at both places. In some cases, however, you may need to set parameters from both the terminal and the printer. Sometimes you can set a single parameter at the printer's front panel and from the terminal (using terminal-based copy commands). However, if you set a single parameter at both the terminal and the printer, the terminal setting overrides the printer's front panel selection.

You can set printing and imaging parameters for a single port independent of any other port settings, to reflect individual application needs.

Typically, you would set terminal and printer parameters once to reflect your most common type of application; you would not need to reset them for each print. You only need to adjust the settings if you need a special type of print.

Setting Parameters from the Printer

This topic describes some basic features on the printer, including the front panel windows and keys. It explains how to use the interactive windows set parameters at the printer. In addition, it explains some common settings on the front panel, but does not cover details about every front panel window or settings on the windows. For a complete explanation of the front panel windows, see Appendix B, *Front Panel Windows*.

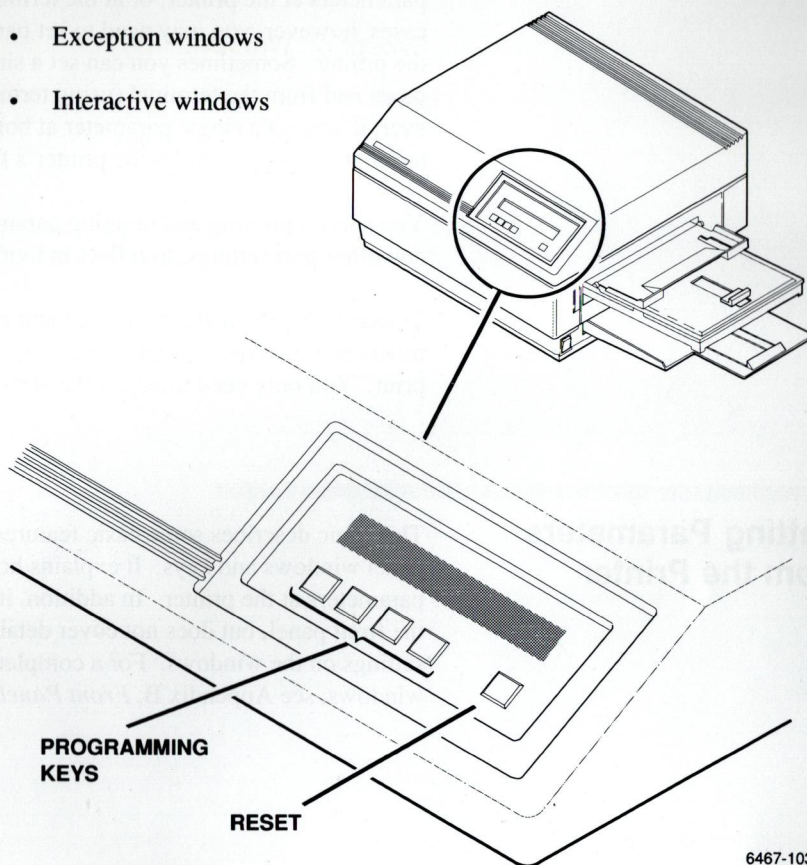
The Front Panel

The printer's front panel has a two-line by 40-character liquid crystal display (LCD). It also has four programming keys and a reset key (refer to Figure 2-1). The front panel is used in setting up the printer's imaging and printing parameters.

The front panel display shows a series of windows:

- An OPERATIONAL STATUS window
- Exception windows
- Interactive windows

Figure 2-1. The Front Panel Display.



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The OPERATIONAL STATUS Window

The OPERATIONAL STATUS window is always displayed except when the printer is being programmed in interactive mode or when exception messages are being displayed. It shows the printer's current operating status and is updated in real-time (refer to Figure 2-2).

Exception Windows

The exception windows display printer failure message or messages requiring user intervention (for instance if media needs to be loaded). Refer to Appendix D, *Messages*, for details.

Interactive Windows

The interactive windows are used to program the printer. The four programming keys on the front panel are used to control activity of these windows.

Figure 2-2. OPERATIONAL STATUS Window.

RECEIVING				IMAGING				PRINTING				COPIES			
1	2	3	4	1	2	3	4	1	2	3	2	00001			
IDLE															

6467-104

Using the Interactive Mode

The programming keys and the interactive windows are used to program the printer.

The Programming Keys

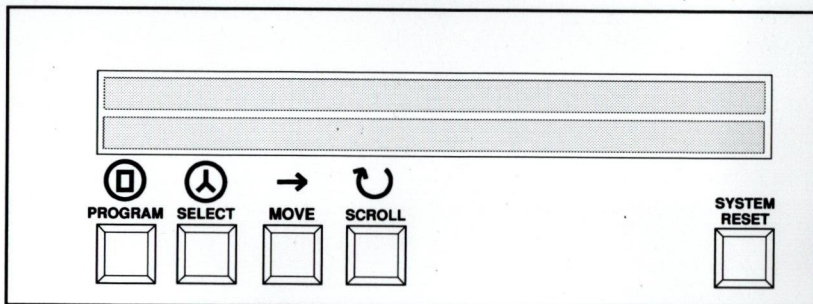
You use the four front panel programming keys to program the printer using the front panel (refer to Figure 2-3).

- **PROGRAM:** Press this key to enter the interactive mode and program the printer. Press it a second time to exit back out of interactive mode when you are finished setting parameters.
- **SELECT:** Press this key to save the currently displayed selection in the printer's memory. The currently programmed selection is marked with an asterisk (*).
- **MOVE:** This key moves the cursor from its present position to the next field. When cursor is at the window's home position, pressing this key moves the cursor to the option field.
- **SCROLL:** This key cycles the list of choices at the current field. Each time you press the key, the next possible choice is displayed. If you must enter multiple digits, SCROLL cycles each digit individually.

When the cursor is positioned at the upper-left corner of the display, SCROLL cycles through the entire list of displays. If the cursor is positioned in an option field, SCROLL cycles through the choices for that field.

- **RESET:** This key has the same affect as powering down the printer. Work in progress is lost, but parameters are saved.

Figure 2-3 Front Panel Input Keys.



6467-105

The Interactive Windows

Most of the interactive windows access a different printing or imaging parameter. Table 2-1 lists all of the interactive windows. One very important window, the SELECT GRAPHICS APPLICATION MODE window, lets you set a group of imaging parameters at one time. This window is explained later in this section.

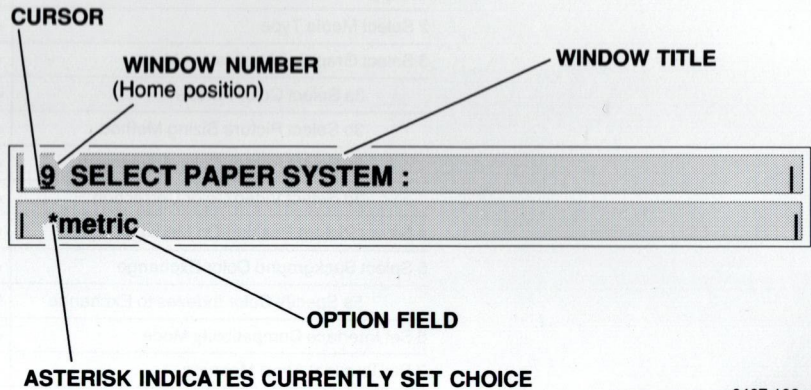
Table 2-1
INTERACTIVE WINDOWS

Window Title	Factory Default Setting
1 Copy Last Picture Printed	N/a
2 Select Media Type	*loaded media
3 Select Graphics Application Mode	*color pie charts, bar graphs
3a Select Color Palette	*full color 1
3b Select Picture Sizing Method	*maximize by interpolation
3c Select Printer Color Adjustment	*do not adjust
3d Select Video Color Correction	*do not adjust
4 Select Picture Position On Media	*landscape-centered
5 Select Background Color Exchange	*print colors as received
5a Specify Color Indexes to Exchange	N/a
6 Set Interface Compatibility Mode	*Tektronix 4693D printer
7 Set Terminal Abort Meaning	*abort picture printing
8 Specify Terminal Pixel Aspect Ratio	*pixels are 32 high by 32 wide
9 Select Paper System	*American

All of the interactive windows contain the following information (refer to Figure 2-4).

- A number and title on the top line in uppercase letters.
- Option fields on the second line of the window in lowercase text or digits. The currently programmed choice is marked with an asterisk (*).
- The window number is displayed at the upper-left corner of the window. This position is also the home position — that is, the position of the cursor when a new window is displayed, and the position to which it is returned after SELECT is pressed.

Figure 2-4. Parts of the Interactive Windows.



6467-106

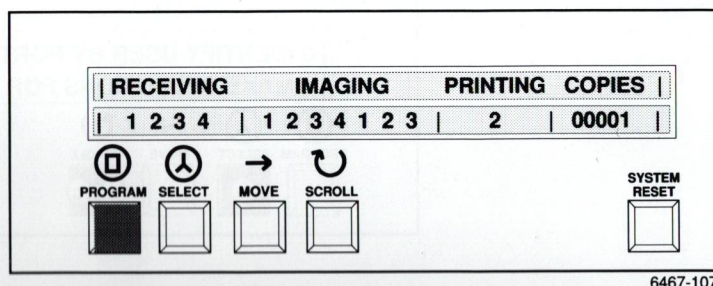
Programming the Printer

Set the printing and imaging parameters to reflect your most common needs in printing.

Use the front panel programming keys as described earlier in this section to program the printer's printing and imaging parameters. Set the printer as follows (refer to Figures 2-5a to 2-5e below):

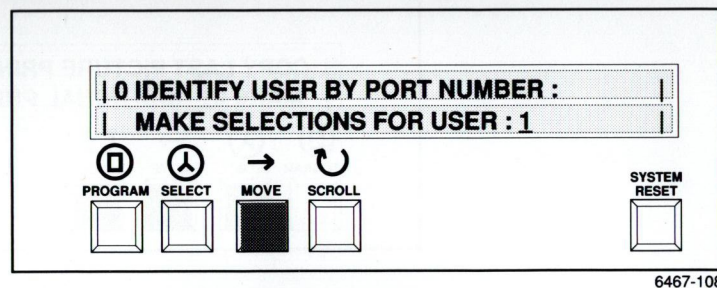
1. The OPERATIONAL STATUS window is displayed until you press the PROGRAM key to enter the interactive mode. The numbers on the OPERATIONAL STATUS window indicate which ports have jobs being received, imaged, and printed.

Figure 2-5a. Press PROGRAM Key.



2. The USER IDENTIFICATION window displays first. Enter your user port number on this window. You must make this setting before programming options on any other interactive windows. When this window first displays, the cursor is in the home position. Press the MOVE key to position the cursor at the option field.

Figure 2-5b. USER IDENTIFICATION Window.

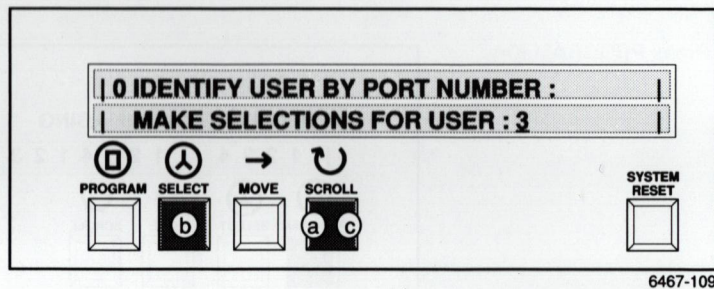


3. Press the SCROLL key until your user port number is displayed. The users for each port number should have been identified at installation and labeled on the printer or the quick reference booklet attached to the printer. If not, look at the back of the printer and check which printer port is connected to your interface cable.

Press the SELECT key to enter the user port number into printer memory. The cursor returns to the window's home position.

Press the SCROLL key to display the next window.

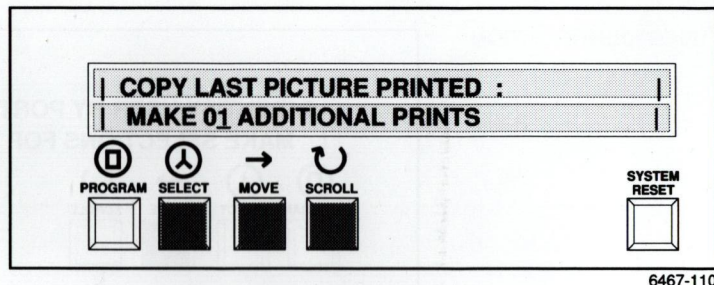
Figure 2-5c. Enter User Port Number.



4. Make selections in any of the interactive windows (shown in Table 2-1) using the MOVE, SCROLL and SELECT keys as explained above.

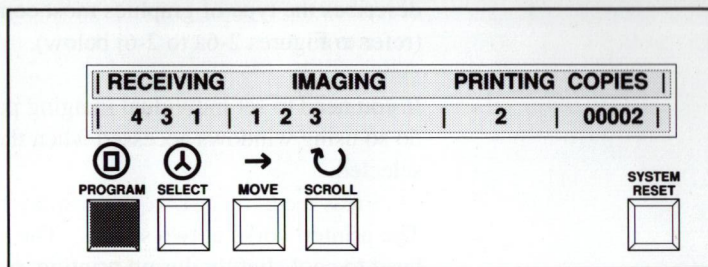
If you do not change a window's setting, the current setting remains in affect. The first time the window is accessed after installation, the windows are set to factory defaults.

Figure 2-5d. Program the Printer.



5. When you have set all the parameters you need to adjust, press the PROGRAM key to return to the OPERATIONAL STATUS window.

Figure 2-5e. Press PROGRAM Key.



6467-111

The rest of this section describes some of the windows, including the SELECT GRAPHICS APPLICATION MODE window, which you will probably use the most. For details on this window, see topic just ahead “Setting the SELECT GRAPHICS APPLICATION MODE window”.

To set the printer up to accept data from a non-Tektronix parallel interface host, see the topic toward the end of this section, “Setting the Printer for a Non-TPI Interface Host”.

Refer to Appendix B, *Front Panel Windows*, for a complete explanation of all the front panel windows and parameters available.

Setting the SELECT GRAPHICS APPLICATION MODE Window

The SELECT GRAPHICS APPLICATION MODE window provides a shortcut method of setting groups of imaging and printing parameters that are appropriate for most applications. Using this window, select the option that describes the type of graphics most commonly printed in your application (refer to Figures 2-6a to 2-6j below).

If you need to set individual imaging parameters for an application, you may do so using windows accessed when the “user defined imaging option” is selected.

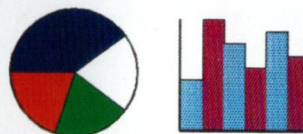
The printer works at two speeds. The lowest speed allows time for the print head to cool slightly during printing, providing the highest quality printed colors; the printer’s high speed does not provide cooling time for the print head, and printed colors are slightly lower in quality. For most images, the print quality is about same between high speed and low speed printing. When your image has very exact colors, low speed is recommended. The options listed below are all printed at high speed except for the COLOR SHADED SOLIDS/IMAGES, and MONOCHROME SHADED SOLIDS/IMAGES, which are printed at low speed.

COLOR PIE CHARTS, BAR GRAPHS

This setting prints images with a full color palette at highest print speed. This color palette arrives at black by printing a composite of magenta, cyan, and yellow inks. This setting uses interpolation to enlarge the image to fit the media. See below for an example image which should be printed using this setting.

Figure 2-6a. COLOR PIE CHARTS, BAR GRAPHS.

- full color
- sized by interpolation
- fastest print speed



| 3 SELECT GRAPHICS APPLICATION MODE : |

| *color pie charts, bar graphs |

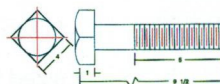
6467-112

COLOR LINE DRAWINGS/TEXT

This setting prints simple color line drawings and pictures containing text. Pictures are printed at highest print speed using eight colors with no dithering. This setting enlarges images using replication, which creates clear, solid lines of a uniform width, and ensures that proportions are true. Below are example images which should be printed on this setting.

Figure 2-6b. COLOR LINE DRAWINGS/TEXT.

- 8 color
- sized by replication
- fastest print speed



Colored Text
ABCDEFGHIJKLMN
abcdefghijklmn
OPQRSTUVWXYZ
opqrstuvwxyz
1234567890

3	SELECT GRAPHICS APPLICATION MODE :	
*color line drawings / text		

6467-113

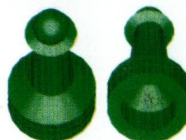
COLOR SHADED SOLIDS/IMAGES

This setting prints complex solids and three dimensional diagrams using a full color palette of over 16 million colors by means of dithering. It creates black by printing a composite of magenta, cyan, and yellow inks. It prints the image at slower print speed for highest quality color. The image is enlarged by means of interpolation.

The dither patterns used can produce a broken line if the line is not a pure color, or saturated black or white. Interpolation can produce lines of varying width, or create slight variations in proportion. Therefore, this setting is best suited for printing solids with many different shades of color, like the examples below.

Figure 2-6c. COLOR SHADED SOLIDS/IMAGES.

- full color
- sized by interpolation
- highest print quality



3	SELECT GRAPHICS APPLICATION MODE :	
*color shaded solids / images		

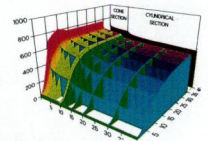
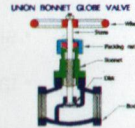
6467-114

COLOR SCHEMATICS

This prints complex diagrams which require full color. Prints images at a high print speed using the full color palette of over 16 million colors using dithering, and creates black by printing a composite of magenta, cyan, and yellow inks. Images are enlarged using replication, which ensures that lines have a uniform width, and proportions remain true. The figure below shows the type of image which should be printed using this setting.

Figure 2-6d. COLOR SCHEMATICS.

- full color
- sized by replication
- fastest print speed



| 3 SELECT GRAPHICS APPLICATION MODE : |

| *color schematics |

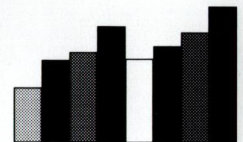
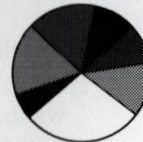
6467-115

MONOCHROME PIE CHARTS/BAR GRAPHS

This prints business type graphics using 256 shades of grey at the higher print speed, and enlarges images using interpolation. See below for an example image which should be printed using this setting.

Figure 2-6e. MONOCHROME PIE CHARTS, BAR GRAPHS.

- 256 grey shades
- sized by interpolation
- fastest print speed



| 3 SELECT GRAPHICS APPLICATION MODE : |

| *monochrome pie charts, bar graphs |

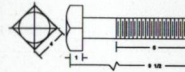
6467-116

MONOCHROME LINE DRAWINGS/TEXT

This setting prints simple line diagrams and images with text at the higher print speed using black and white only. This setting enlarges images using replication, which creates clear, solid lines of a uniform width, and ensures that proportions are true. Below are example images which should be printed on this setting.

Figure 2-6f. MONOCHROME LINE DRAWINGS/TEXT.

- black & white
- sized by replication
- fastest print speed



Text
ABCDEFGHIJKLMN
abcdefghijklmn
OPQRSTUVWXYZ
opqrstuvwxyz
1234567890

3 SELECT GRAPHICS APPLICATION MODE :

***monochrome line drawings / text**

6467-117

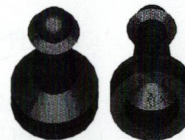
MONOCHROME SHADED SOLIDS/IMAGES

This setting prints complex and detailed images using dithering to create 256 shades of grey. This option enlarges images using interpolation. It prints the image at slower print speed for highest print quality

The dither patterns used can produce a broken line if the line is not saturated black or white. Interpolation can produce lines of varying width, or create slight variations in proportion. Therefore, this setting is best suited for printing solids with many different shades, like the examples below.

Figure 2-6g. MONOCHROME SHADED SOLIDS/IMAGES.

- 256 grey shades
- sized by interpolation
- highest print quality



3 SELECT GRAPHICS APPLICATION MODE :

***monochrome shaded solids / images**

6467-118

MONOCHROME SCHEMATICS

This setting prints complex diagrams at the higher print speed in 256 shades of grey arrived at with dithering. Images are enlarged using replication, which ensures that lines have a uniform width, and proportions remain true. The figure below shows the type of image which should be printed using this setting.

- 256 grey shades
- sized by replication
- fastest print speed



Figure 2-6h. MONOCHROME SCHEMATICS.

| 3 SELECT GRAPHICS APPLICATION MODE : |

| *monochrome schematics |

6467-119

TEKTRONIX 4510 SPECIAL GRAPHICS MODE

This setting prints images from the Tektronix 4510 Rasterizer. All imaging is performed by the 4510.

Figure 2-6i. TEKTRONIX 4510 SPECIAL GRAPHICS MODE.

| 3 SELECT GRAPHICS APPLICATION MODE : |

| *Tektronix 4510 special graphics mode |

6467-120

USER DEFINED PRINTING OPTIONS

This selection accesses additional windows (SELECT COLOR PALETTE, SELECT PICTURE SIZING METHOD, SELECT PRINTER COLOR ADJUSTMENT, and SELECT VIDEO COLOR CORRECTION). These windows enable users to individually select imaging parameters, (refer to Appendix B, *Front Panel Windows* for a complete explanation).

Figure 2-6j. USER DEFINED IMAGING OPTIONS.

| 3 SELECT GRAPHICS APPLICATION MODE : |

| *user defined imaging options |

6467-121

Setting the Printer for a Non-TPI Host

If the image source comes from a host that does not support the Tektronix parallel interface, such as an IBM AT type personal computer, you should set the 6 SET INTERFACE COMPATIBILITY MODE window to the "parallel printer" selection. This changes the TPI signal definitions to match that of non-TPI signals. In addition, set the printer's DIP switches for the non-Tektronix parallel interface, if necessary. (Refer to Appendix A, *Installation Procedures*, for details.)

Using the Printer with the 4510A Rasterizer

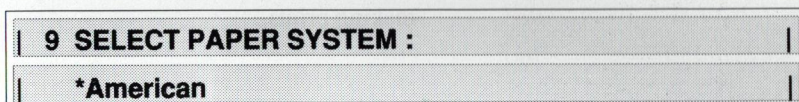
The printer may be used with any of the Tektronix 4510, 4510A or CX4510A Rasterizers. For details, see Appendix F, *Using the Printer With a 4510A Rasterizer*.

Using the Printer for Paper Width

You can set the printer to use either American or metric size media using the SELECT PAPER SYSTEM window (see Figure 2-5). Once set, you should not need to change this setting again unless the media system is changed from metric to American or vice versa.

When American is selected, the printer prints on either letter or legal size media (as selected on the SELECT MEDIA TYPE window). When metric is selected, the printer prints on either A4 or A4 Special size media.

Figure 2-7. SELECT PAPER SYSTEM Window.



The image shows a screenshot of a computer screen displaying a window titled "9 SELECT PAPER SYSTEM :". Below the title bar, the text "*American" is visible, indicating the selected paper system. The window has a simple rectangular border with a title bar and a content area.

6467-122

Setting Parameters at the Terminal

You can set some printing and imaging parameters using terminal hard copy commands. Every Tektronix terminal has its own set of available hard copy commands.

For a complete list of the hard copy commands available on a particular terminal, enter setup mode and then type STATUS HC on the terminal. This prompt will cause the terminal to display the complete list of hard copy commands available. Refer to Appendix E, *Tektronix Terminal-Based Copy Commands* for details.

Making a Test Print

Print a test picture to verify that the printer is set up correctly. Access the PRINT A TEST PICTURE window and choose a test pattern.

If the printer is busy when the test picture is requested, the message "PRINTER QUEUE IS MOMENTARILY BUSY" appears for a short time, until the printer is able to accept the request. Then, when the printer can process the request, the busy message disappears, and the test picture prints.

Making a Print

After setting up the printer, it can correctly print screen images under terminal control. Sometimes the control on the terminal is labeled the hard copy button. Refer to Section 3, *Operating Instructions*, for details on making prints.

Section 3

Operating instructions

Operating instructions

This section provides general operating instructions about making prints after the printer and terminal have been set up properly.

It does not contain information about setting up terminals and printers to make prints, nor any details about front panel settings. Setup information is located in Section 2, *Preparing to Make a Print*. For detailed explanation of the front panel settings, refer to Appendix B, *Front Panel Windows*. Refer to Appendix J, *Glossary of Terms*, for definitions of unfamiliar terms.

Media

Loading Media

Before the printer can start printing your job, its sensors tell it if the correct media is loaded in the paper cassette. If the job which was printed immediately before your job used a different type of media than your job requires, the printer displays a message to load paper or transparency film.

If the paper cassette is out of media, the printer displays the OUT OF PAPER message on the front panel.

This section briefly describes loading media in the topics "Making a Print". Complete details on loading media are located in Section 4, *Maintenance and Troubleshooting*.

Media and Copying Area

Be sure to use only paper and transparency film specified in Appendix H, *Options and Accessories* of this manual.

Paper or transparencies can be automatically fed from a paper cassette with a maximum capacity of 100 sheets of paper, and approximately 50 sheets for film.

The shaded areas in Figure 3-1 show how the 4693D positions and sizes copies on paper or film.

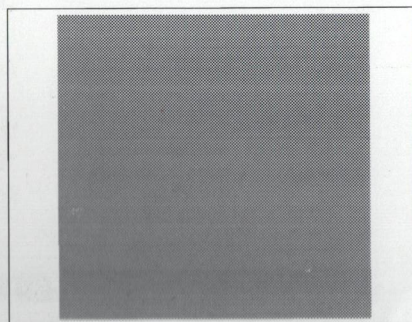
Figure 3-1. Copy Position on Media.

A. Copy Position on Letter-Size Media

PRINTED AREA

American
8.13" x 8.38"

Metric
200mm x 230mm

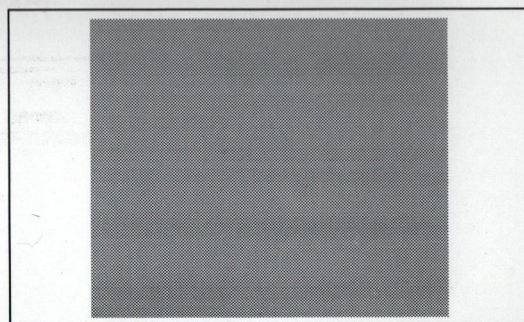


B. Copy Position on Legal-Size Media

PRINTED AREA

American
8.13" x 10.74"

Metric
200mm x 273mm



6467-123

Making a Print

After you set up the printer and terminal properly, the printer can make prints. You can print on paper or transparencies as described below. Make a print as follows, and refer to Figures 3-2a to 3-2f.

1. If any imaging and printing parameters need to be changed for this print, access the interactive windows and make the changes needed. (Refer to Section 2, *Setup Instructions*, for details.)

At this time you may program the printer to print your job on a specific type of media. Use the SELECT MEDIA TYPE window to select "letter sized paper", "legal sized paper", "transparencies", or "loaded media". If you choose "loaded media", the job will print on whatever media happens to be loaded in the printer at the time your job is ready to print.

If most of the users of the printer print on the same type of media, select "loaded media". If users print on different types of media, you should specify the type of media you want.

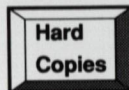
Figure 3-2a. Select Media Type and Other Parameters as Needed.

SELECT MEDIA TYPE :
PRINT ON letter sized paper

6467-124

2. Transmit the screen image to the printer by using the terminal control button. This is sometimes labeled the hard copy button.

Figure 3-2b. Send Image from Terminal.



6467-125

3. Check the status of your print job on the OPERATIONAL STATUS window (shown in Figure 3-2c). This window always displays except when the printer is being programmed, or when an error or warning message is being displayed.

If several ports are connected to the printer, and if the printer has sufficient memory, jobs sent may be placed in a waiting line before being printed. The OPERATIONAL STATUS window shows the status of each job as it is being received, imaged, and printed, and the order in which the jobs will be printed.

The jobs are indicated by port number, and are displayed so that the oldest job (first job sent) is rightmost at each position (or field) on the display. Refer to Appendix B, *Front Panel Windows* for details.

Figure 3-2c. Check Status of Print Job.

RECEIVING				IMAGING				PRINTING				COPIES			
1	2	3	4	1	2	3	4	1	2	3	4	2	0000	1	1

6467-126

4. If you requested "letter sized paper", "legal sized paper", or "transparencies" on the SELECT MEDIA TYPE window, the printer may stop and display the message "USER X PICTURE REQUESTS: letter paper" (or "legal paper" or "transparencies"). The second line of the message is "PRINTER WILL WAIT FOR 10:00 MINUTES".

The message will only appear if the preceding job used a different type of media than what you requested for your job. It will not display if you requested "loaded media".

This USER REQUEST window will display (and count down the time) for 10 minutes, waiting for the user to change the media. After 10 minutes, the printer will print the job on whatever media is loaded even if it is not the type of media you requested.

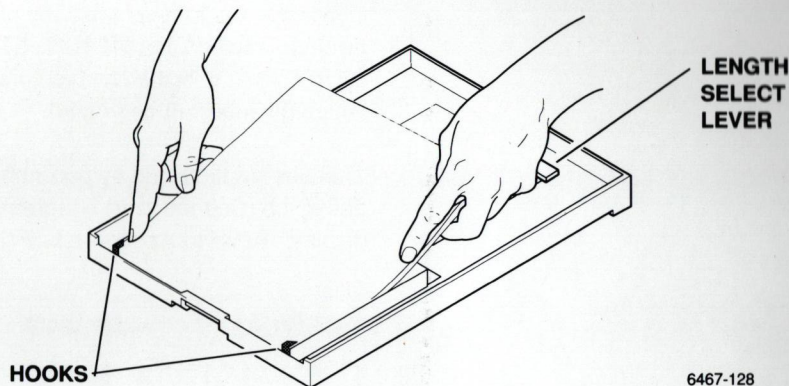
Figure 3-2d. USER MEDIA REQUEST Message Displays.

USER 1 PICTURE REQUESTS : letter paper															
PRINTER WILL WAIT FOR 10:00 MINUTES															

6467-127

5. Load paper or transparencies into the printer's paper cassette if needed. Load paper so that the whiter, smoother side is face up. Load paper-backed transparencies so that the film side is face up. Adjust the length select lever for the correct length of your media. For complete instructions, see the topic "Loading Media" in Section 4.

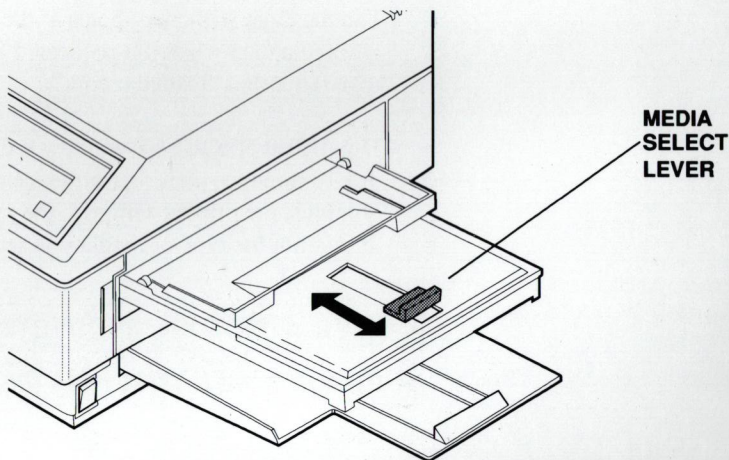
Figure 3-2e. Load Media.



6467-128

6. Adjust the media select lever on the paper cassette. If you loaded paper, make sure to pull the media select lever on the paper cassette all the way out from the printer. If you loaded transparencies slide the media select lever on the top of the paper cassette towards the printer until it stops. Insert the paper cassette into the printer. The printer will start to print your image.

Figure 3-2f. Adjust the Media Select Lever.



6467-129

7. Check that your print looks the way you intended. If not, check the imaging parameters, especially the SELECT GRAPHICS APPLICATION MODE window to make sure they are set up correctly.

Reprinting Last Picture

There are two ways of making multiple prints: by requesting multiple copies with the original print request, and by requesting a reprint of the last picture printed.

Request reprints from the front panel as soon after the first printing as possible, or the image may not be available for reprint. This is because images are retained in the printer's memory only until a new picture is sent to the printer's memory, replacing the older image data. After the original print is sent to the printer, request reprints as follows (refer to Figure 3-3):

1. After the original copy has been printed, and before another image is printed, access the COPY LAST PICTURE PRINTED front panel window.

The COPY LAST PICTURE PRINTED window will display the message shown in Figure 3-3a if you can make a reprint. Enter the correct number of reprints, and press the SELECT key.

Figure 3-3a. Enter Number of Reprints.



1 COPY LAST PICTURE PRINTED :
MAKE 01 ADDITIONAL PRINTS

6467-130

2. After successfully requesting a reprint, the message shown in Figure 3-3b appears.

Figure 3-3b. Message Shows Request is Complete.

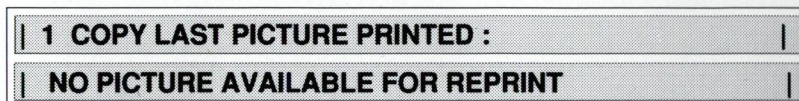


1 COPY LAST PICTURE PRINTED :
PICTURE IS NOW QUEUED FOR PRINTING

6467-131

3. If the image is no longer available for reprint, the message shown in Figure 3-3c will appear instead of the window shown in Figure 3-3a.

Figure 3-3c. Message Shows You Cannot Make a Reprint.

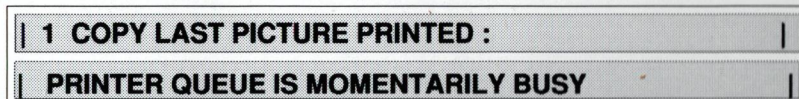


1 COPY LAST PICTURE PRINTED :
NO PICTURE AVAILABLE FOR REPRINT

6467-132

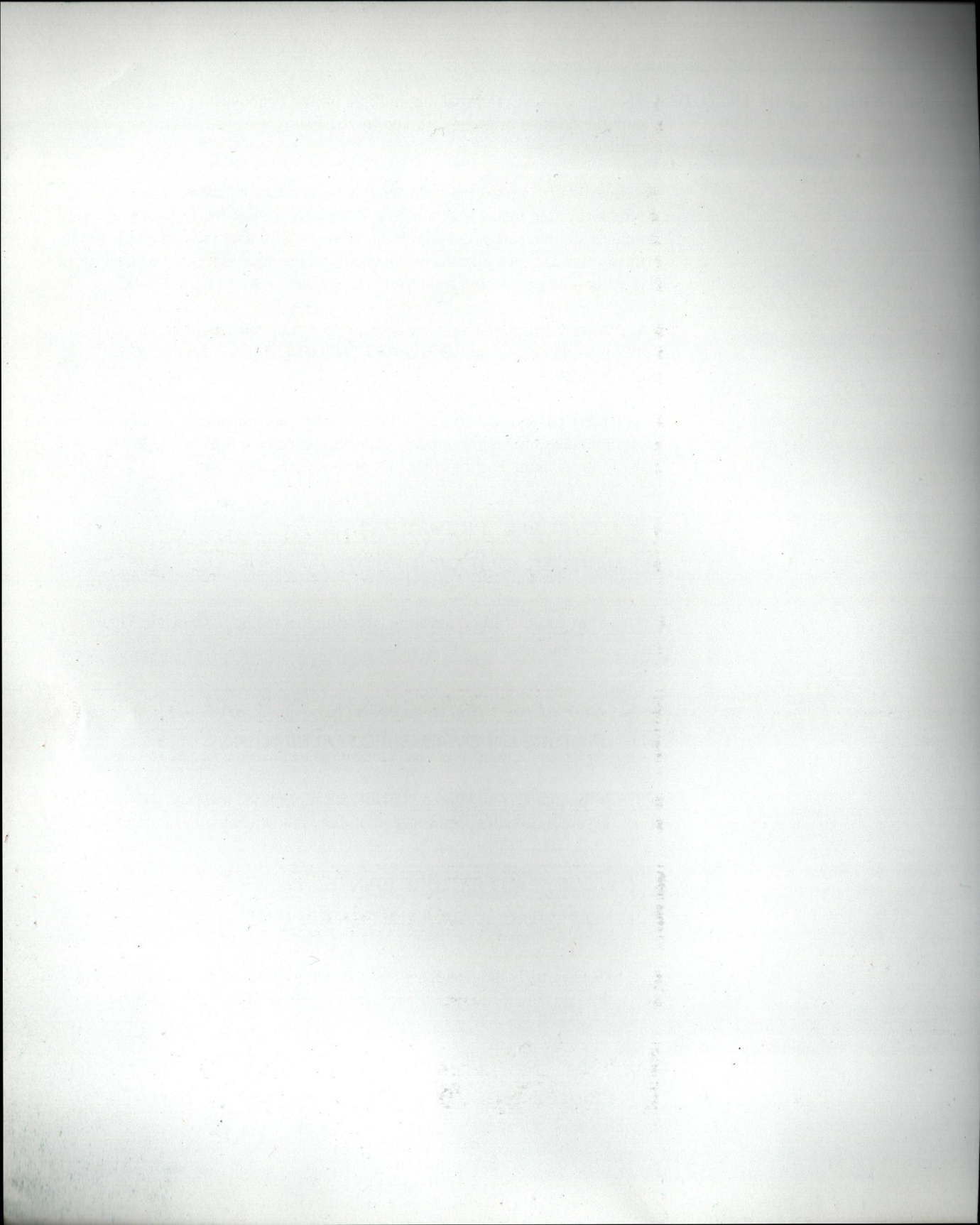
4. Occasionally the front panel will lock for a few moments before it can initiate the reprint, and the message shown in Figure 3-3d will appear.

Figure 3-3d. Message Shows Printer is Busy.



1 COPY LAST PICTURE PRINTED :
PRINTER QUEUE IS MOMENTARILY BUSY

6467-133



Section 4

General maintenance

General maintenance

This section has instructions about loading paper or transparency film, and transfer rolls. It also tells how to troubleshoot simple problems not requiring a service call, such as freeing media which is jammed in the printer.

Refer to Appendix J, *Glossary of Terms*, for definitions of unfamiliar terms. Refer to Appendix D, *Messages*, for explanations of messages displayed on the front panel.

Loading Media

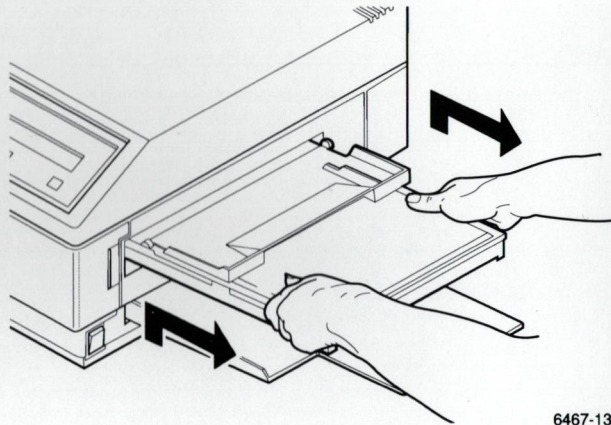
You will need to load media if the printer is out of media, or if you set the printer front panel to print an image on something other than the loaded media.

The printer displays the "OUT OF PAPER" message when the printer is out of media. If your print job requires something other than the loaded media, it displays the message "USER X PICTURE REQUESTS letter paper", or "legal paper", or "transparencies". The second line of the message displays "PRINTER WILL WAIT FOR 10:00 MINUTES". The printer waits for 10 minutes while displaying the time left, and then prints the image on any loaded media after that 10 minutes is up.

Follow these steps to load paper or transparency film in the paper cassette, and refer to Figures 4-1a to 4-1f, below.

1. Gently lift up on the end of the paper cassette, and pull it out of the printer.

Figure 4-1a. Remove the Paper Cassette.



6467-134

2. Lift off the cassette cover.

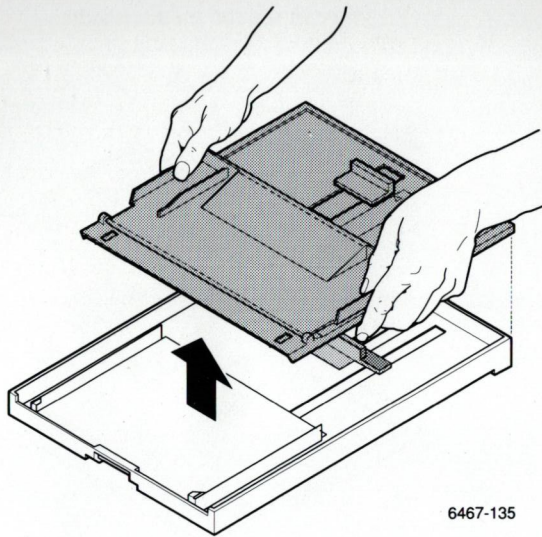


Figure 4-1b. Lift off Cassette Cover.

6467-135

3. Place paper or film into the cassette. Fan the new paper or film before placing it into the paper cassette, and then slide it below the hooks located at the inside corners of the paper cassette.

Insert paper so that the whiter and smoother side of the paper is up. Place paper-backed transparency film so that the film side is face up. The cassette will hold approximately 100 sheets of paper or 50 sheets of transparency film.

Adjust the length select lever in the paper cassette to accommodate the length of the media you are loading.

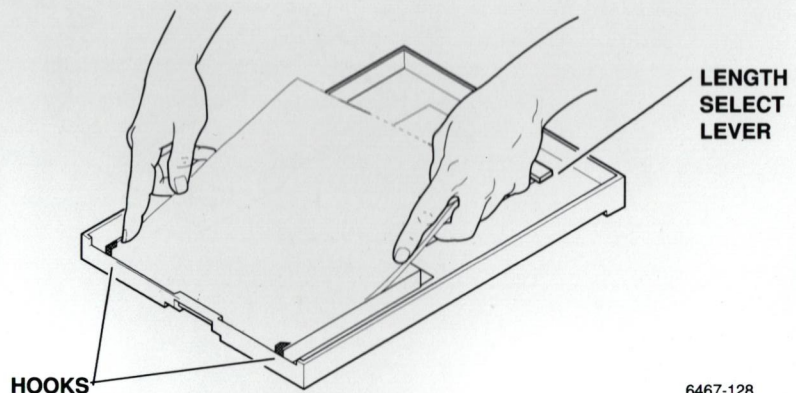
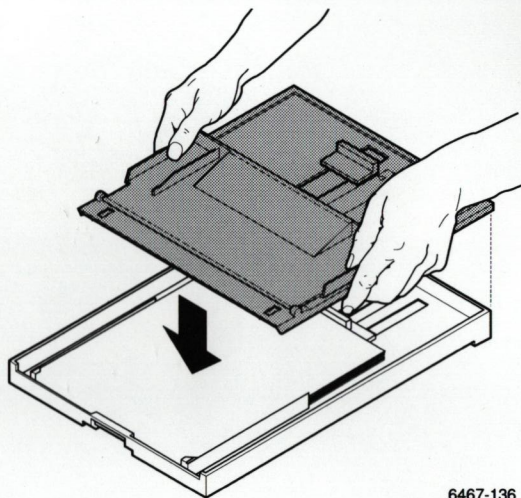


Figure 4-1c. Place Media in Paper Cassette.

6467-128

4. Replace the cassette cover. Make sure that the hinged end of the cassette cover (the end that goes into the side of the printer) is opened up so that you can see the media inside.

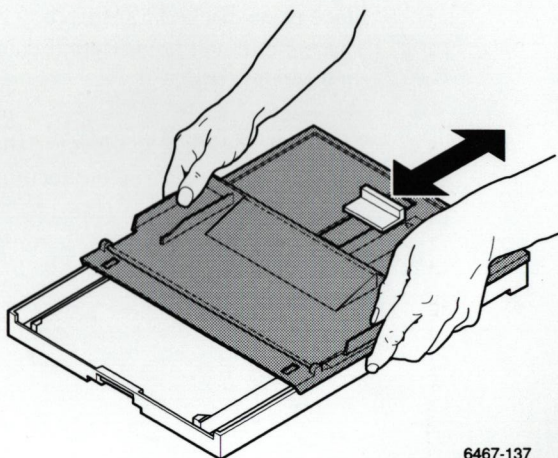
Figure 4-1d. Replace Cassette Cover.



6467-136

5. Adjust the media select lever for either paper or transparencies. Pull the lever out from the printer if you loaded paper; push the lever in toward the printer if you loaded transparencies.

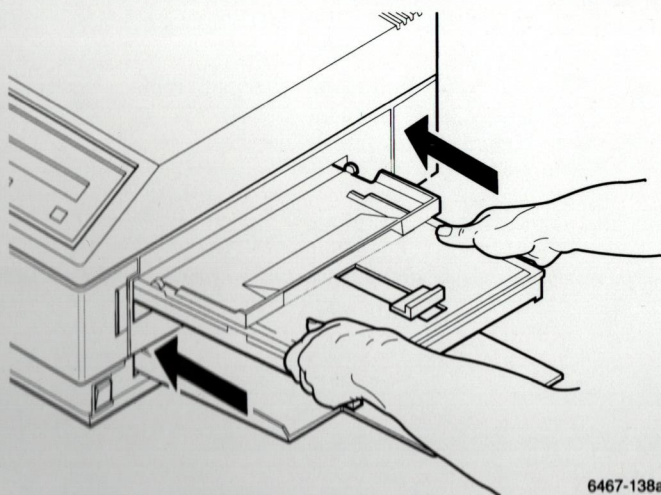
Figure 4-1e. Adjust Media Select Lever.



6467-137

6. Reinsert the cassette into the side of the printer by tilting the outer end up a little and pushing the other end into the printer at a slant.

Figure 4-11. Place Paper Cassette in Printer.



6467-138a

Replacing the Transfer Roll

When the printer's transfer roll is used up, the printer displays the message "OUT OF RIBBON".

Follow these steps to replace the transfer roll, and refer to the Figures 4-2a to 4-4c below.

NOTE *During this procedure, you may need to open the top half of the printer in order to take out the old transfer roll. If you open the top half, however, all images waiting to print are will be lost, because the printer turns off automatically.*

Removing Used Transfer Roll

1. Open the front cover.

Turn the thermal head release lever 90 degrees to the left (counter clockwise).

THERMAL HEAD
RELEASE LEVER

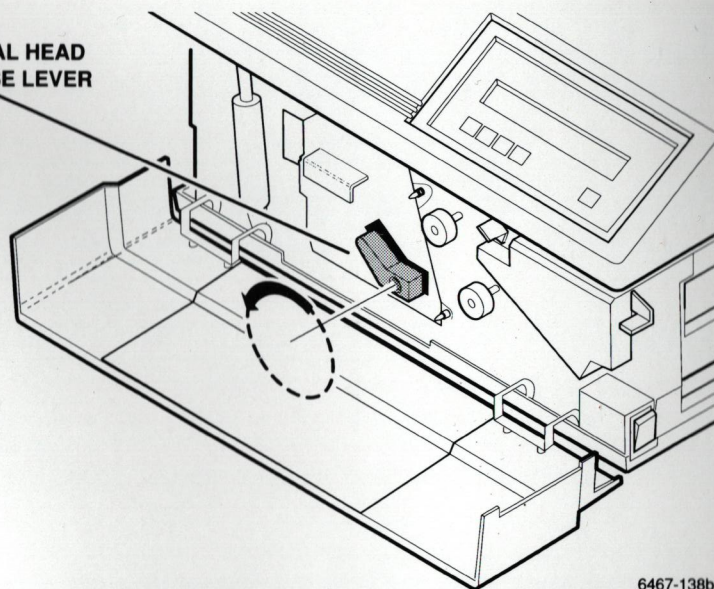


Figure 4-2a. Turn Thermal Head Release Lever.

6467-138b

2. Pull the transfer roll cassette gently forward on the printer's slide rail until the cassette stops.

Remove the transfer roll cassette from the printer's slide rail by lifting the green tabs on the cassette up and away from the printer.

If you are unable to slide the transfer roll cassette out from the printer, the used up transfer roll is probably loose on the transfer roll cassette, which causes it to catch on the side of the printer.

If this happens, lift the upper green release lever and carefully open the upper half of the printer. This turns the power off, and all images waiting to be printed are lost.

Tighten the transfer roll on the cassette and continue to pull the transfer roll cassette forward until it stops.

If you are temporarily removing the transfer roll from the printer in order to clean the inside of the printer, set the transfer roll cassette on its end with the front of the cassette up. This will protect the transfer roll from tearing or picking up dust from the table surface until you are ready to reload it into the printer.

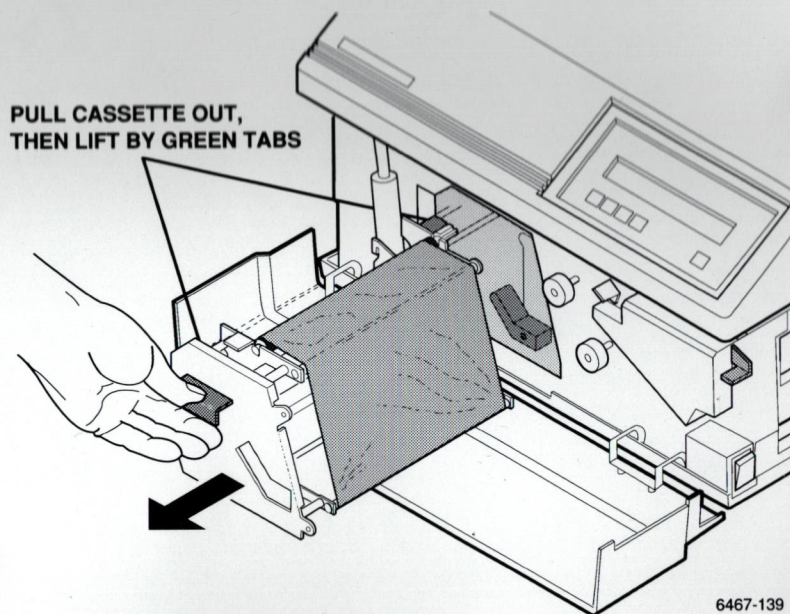


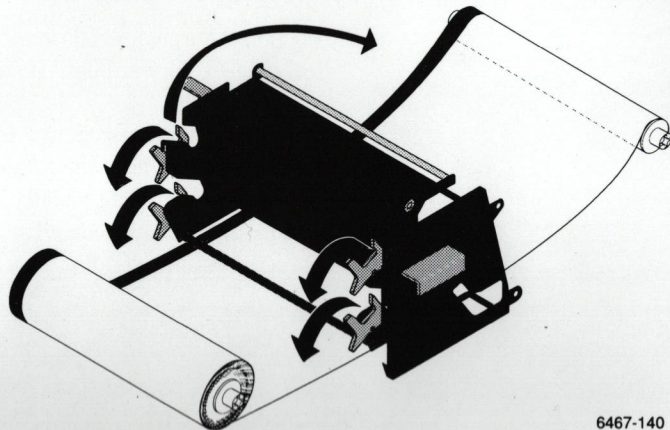
Figure 4-2b. Remove Transfer Roll Cassette from Printer.

3. Remove the transfer roll from the transfer roll cassette. Turn the four green holders down to release the rolls and remove two rolls.

NOTE *Negative images of all printed copies will remain on the exhausted transfer roll. If this is a security risk, dispose of the transfer roll properly.*

Each time you change transfer rolls, it is a good idea to clean the rubber tension roller on the transfer roll cassette using alcohol, or by using a piece of sticky tape as discussed and illustrated during later topic, "Cleaning the Transfer Roll Tension Roller".

Figure 4-2c. Remove Transfer Roll from Transfer Roll Cassette.

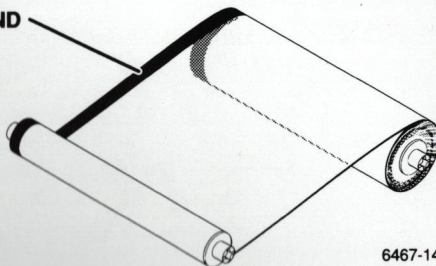


6467-140

Loading Fresh Transfer Roll into Transfer Roll Cassette

1. Unroll a little of the new transfer roll onto a clean flat table as shown, and notice the black band along one side of the transfer roll.

BLACK BAND

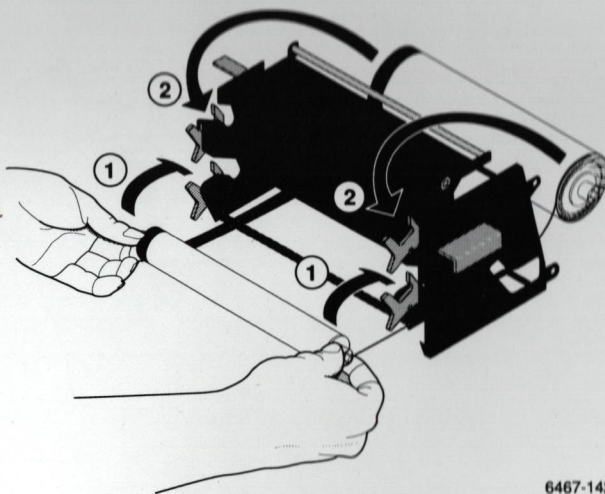


6467-141

2. Place the transfer roll cassette on top of the unrolled transfer roll as shown in the illustration. The black band on the ribbon should be under the back end of the cassette (the side which goes farthest into the printer).

Place the ends of the transfer roll into the green transfer roll holders on the transfer roll cassette. (The green transfer roll holders should still be in the released position.) First place the smaller (empty end) of the new transfer roll into the bottom holders. Then pull the larger (fuller end) of the transfer roll over the top of the cassette and place it into the upper holders.

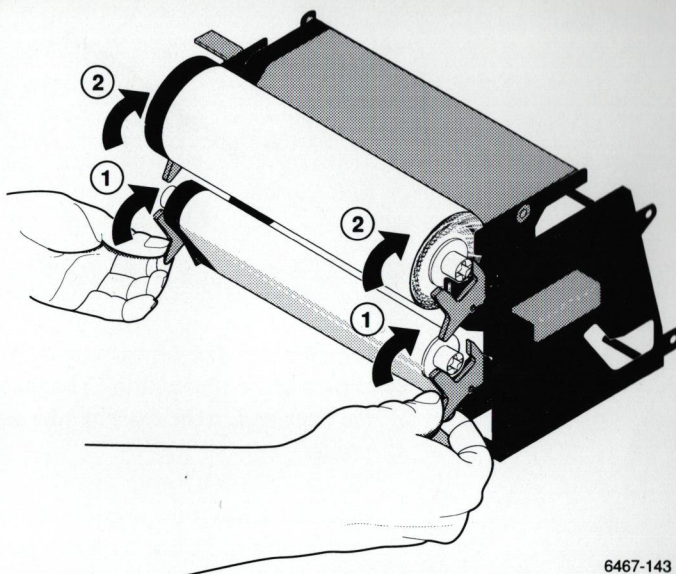
Figure 4-3b. Place Transfer Roll Ends into Transfer Roll Holders.



6467-142

3. Turn the green transfer roll holders in the direction shown in the picture to lock the transfer roll in place.

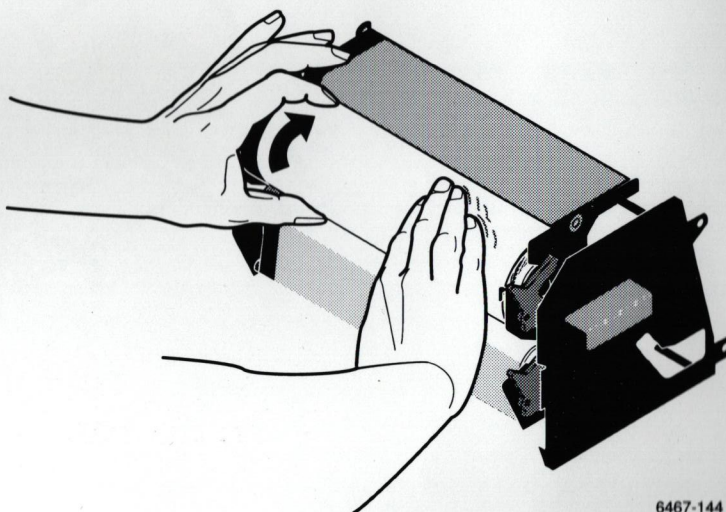
Figure 4-3c. Lock Transfer Roll Holders.



6467-143

4. Smooth out any wrinkles on the transfer roll by rotating the upper roll as shown in the picture. The transfer roll must be tight.

Figure 4-3d. Tighten Transfer Roll.

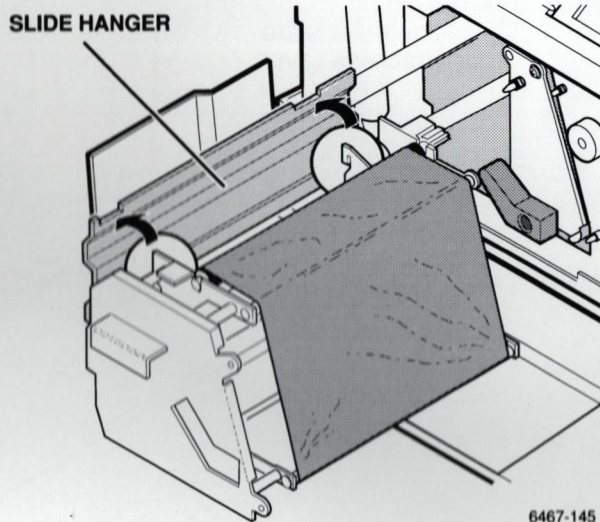


6467-144

Placing Transfer Roll Cassette into Printer

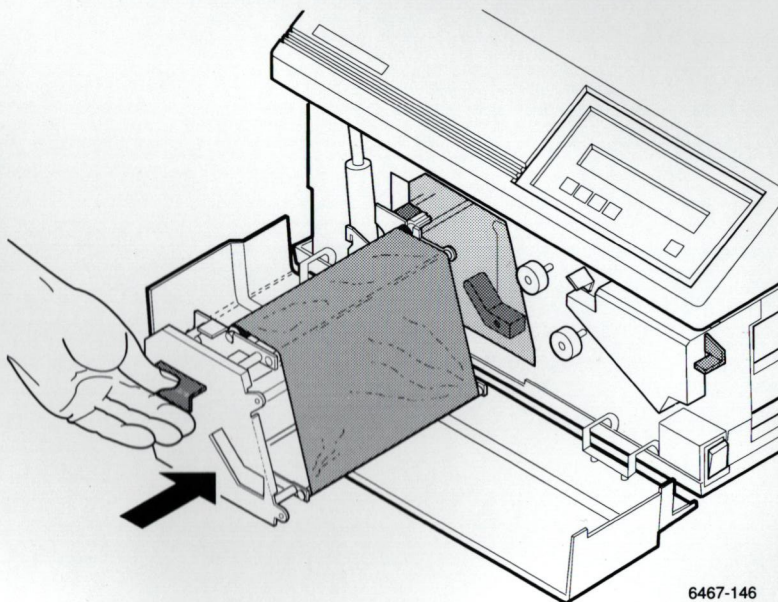
1. Hook the transfer roll cassette onto the cassette slide rail on the printer.

Figure 4-4a. Hook Transfer Roll Cassette onto Slide Rail.



2. Carefully push the slide rail and transfer roll cassette into the printer as far as possible. If you had to open the upper half of the printer, close it now and the power automatically turns on.

Figure 4-4b. Push Transfer Roll Cassette into Printer.



3. Turn the thermal head release lever to the right to lock the transfer roll cassette in place, and close the front cover.

**THERMAL HEAD
RELEASE LEVER**

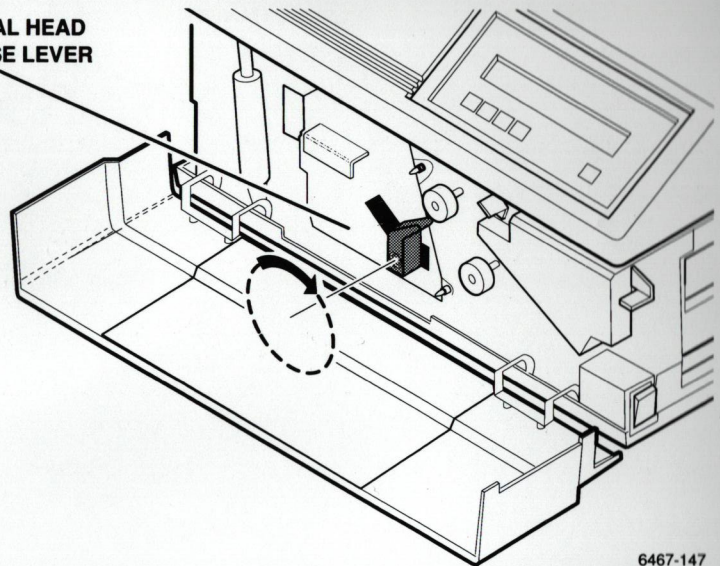


Figure 4-4c. Lock Transfer Roll into Printer.

6467-147

Fixing Media Jams

The printer stops and the front panel displays a message when a paper or transparency is jammed.

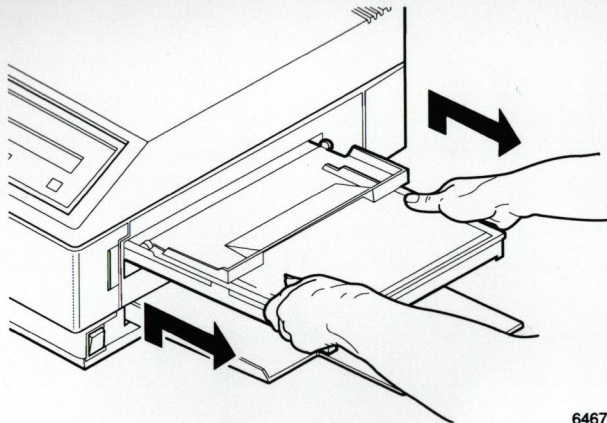
CAUTION *You will lose your print image, and any others stored in the printer, if you open the upper half to clear the jam.*

Misfeeds in the Feed-in Area

Remove the misfeed from the feed-in area as follows, and refer to Figures 4-5a to 4-5c below.

1. Remove the paper cassette gently by lifting and pulling it out.

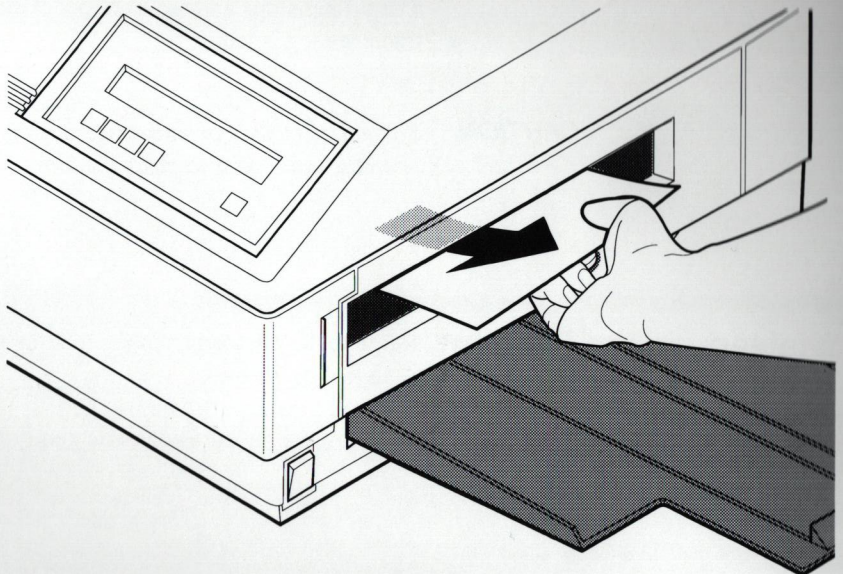
Figure 4-5a. Remove Paper Cassette.



6467-134

2. Gently pull out the misfed paper or film and replace the paper cassette.

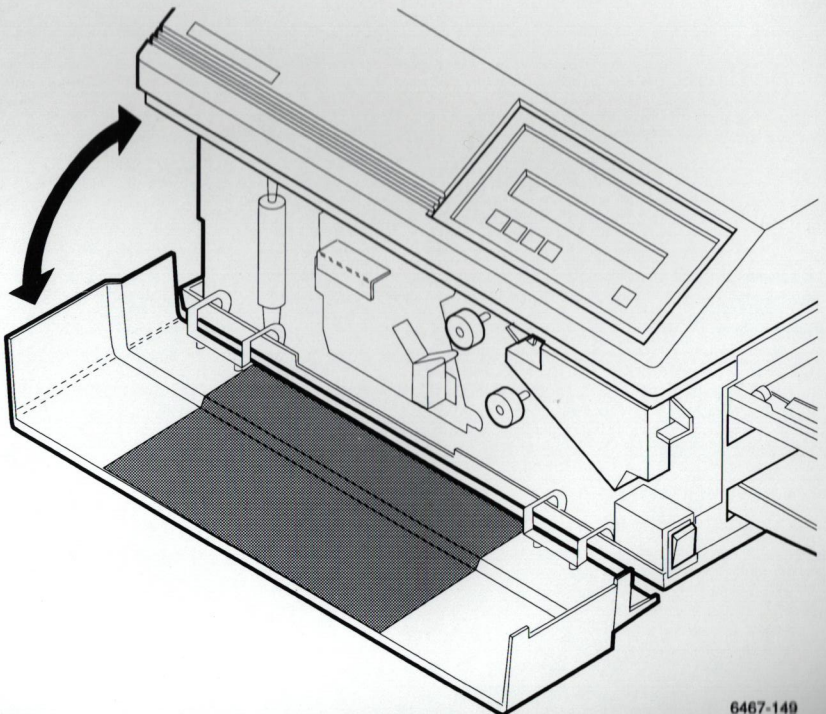
Figure 4-5b. Pull out Misfed Media.



6467-148

3. Open and close the front cover to cancel the misfeed message.

Figure 4-5c. Open and Close Front Cover.



6467-149

Removing Misfeeds from the Print Area

Remove misfeeds from the print area as follows and refer to the Figures 4-6a to 4-6c below.

CAUTION *You may need to turn off the power to clear a misfeed in the print area. Note that all images sent to the printer but not yet printed will be lost when the power is turned off, and will need to be resubmitted.*

Some misfeeds are cleared by opening and closing the front cover, so try that first. If that doesn't work, follow the directions below

1. Turn the power switch off. Remove the paper cassette and the receiving tray and then open the front cover. Lift the upper half green release lever and carefully open the upper half of the printer.

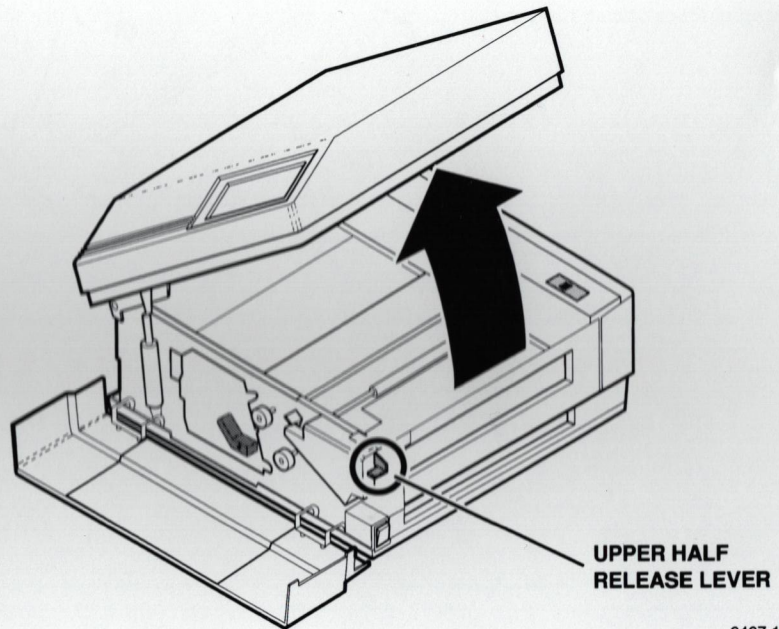


Figure 4-6a. Open Upper Half of the Printer.

6467-150

2. Open the paper feed unit by lifting up on the green paper feed release lever.

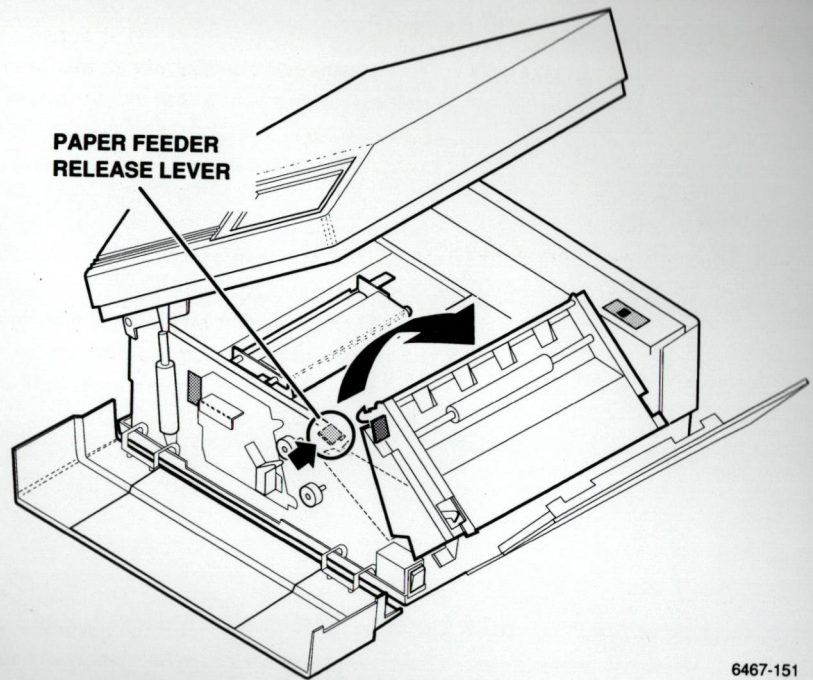


Figure 4-6b. Open Paper Feed Unit.

6467-151

3. Turn the drum knob to the right (clockwise) and gently remove the misfed media.

If the media is stuck in the transport roller, turn the green roller knob clockwise until the misfed media is released.

After clearing the misfeed, return the printer to its operating position. First close the paper feeder and make sure the paper feed release lever catches. Then close the upper half of the printer, making sure it locks, and close the front cover.

Place the receiving tray back on the printer and install the paper cassette by slanting the outside end of the paper cassette up slightly. Turn the printer's power switch back on.

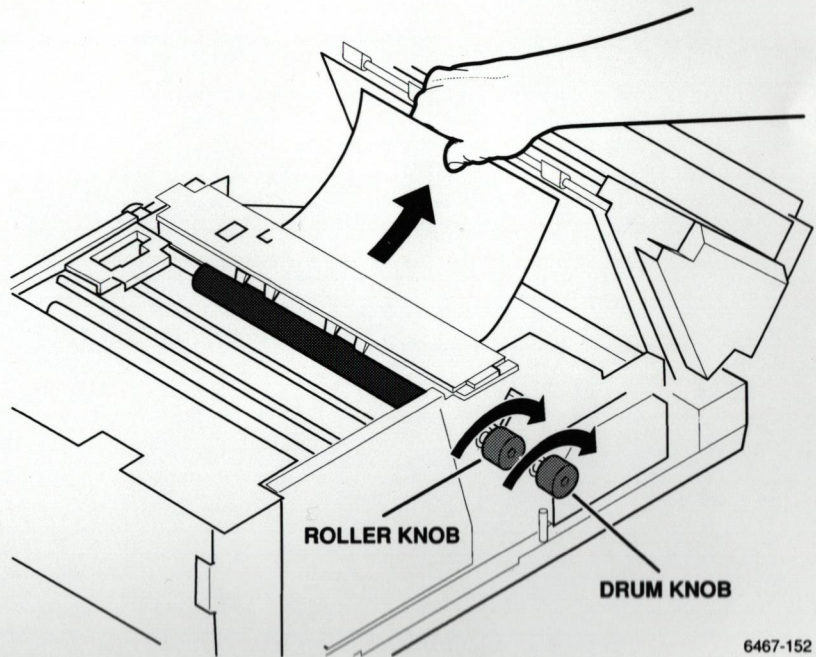


Figure 4-6c. Remove Misfed Media.

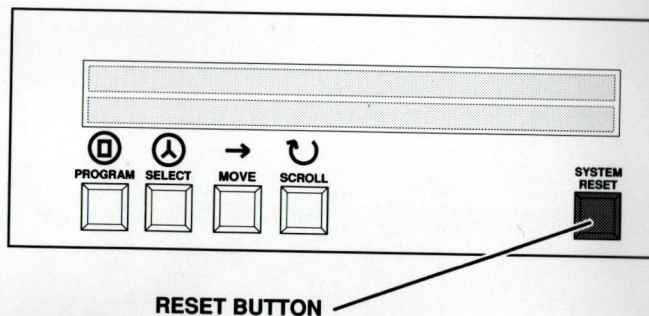
6467-152

Using the Reset Key

The printer's RESET key is located on the front panel (see Figure 4-7 below). Use RESET to clear the printer when it is "locked up", (as when the terminal doesn't stop transmitting, or in case of data transmission errors). Pressing this switch has the same affect as powering the printer off and then back on. When you press the RESET key, all images which were received by the printer, but not yet printed will be lost, and need to be resubmitted. The printer retains printing and imaging parameters in memory.

NOTE *Do not press the RESET key when a print is in process, or the media may jam in the printer.*

Figure 4-7. The RESET Key.



6467-153

User Maintenance

Set up the printer within the proper environmental standards, as stated in Appendix A, *Installation and Moving Procedure*. In addition, the printer should be inspected, lubricated and adjusted regularly, as shown in Table 4-1 below. Proper care is essential to get clean sharp copies.

Clean the printer parts with a lint-free cloth and alcohol. As an extra measure, use sticky tape in cleaning dust from rollers and platen. Call a qualified service technician to adjust, lubricate or replace any parts on the printer.

NOTE *Clean the transfer roll cassette tension roller each time the transfer roll is replaced.*

Table 4-1
PERIODIC MAINTENANCE SCHEDULE

Module	Component	10K Copies	20K Copies	30K Copies	40K Copies
Delivery feed and delivery block	Pickup roller	Clean	Clean	Clean	Replace ^a
	Aligning roller	Clean	Clean	Clean	Clean
	Chain tension		Adjust ^a		Adjust ^a
	Paper exit roller		Clean		Clean
	Paper clutch	Lube ^a	Lube ^a	Lube ^a	Lube ^a
	Paper eject motor gear	Lube ^a	Lube ^a	Lube ^a	Lube ^a
Printer block	Thermal head	Clean	Replace ^a	Clean	Replace ^a
	Platen	Clean	Clean	Clean	Replace ^a
	Bail roller	Clean	Clean	Clean	Clean ^a
	Head left motor gear		Lube ^a		Lube ^a
	Brake spring		Replace ^a		Replace ^a
Transfer roll block	Transfer roll cassette tension roller	Clean	Clean	Clean	Clean
	Transfer roll feed motor		Replace ^a		Replace ^a
	Transfer roll feed motor gear	Lube ^a	Lube ^a	Lube ^a	Lube ^a
Drum block	Drum clamp	Clean	Clean	Clean	Clean

^a Call a qualified service technician to complete this task.

Cleaning the Thermal Head

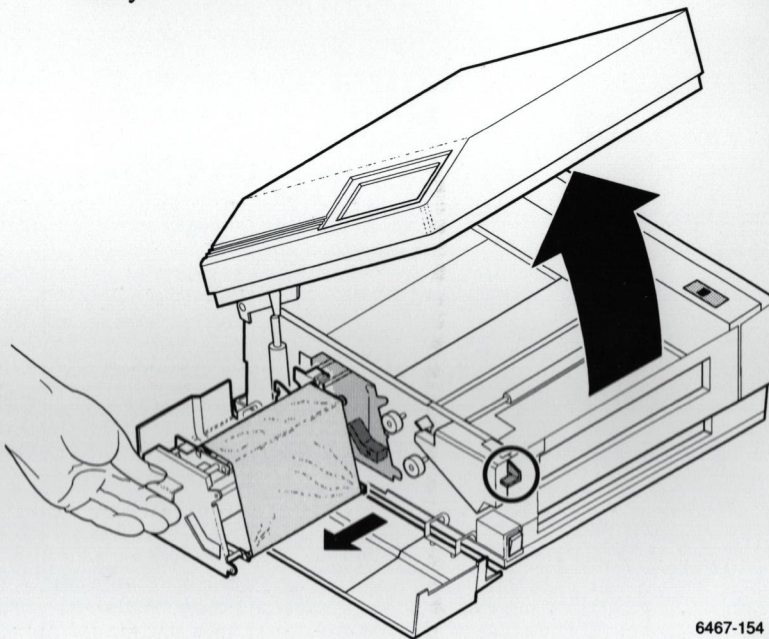
If prints show streaks or spots, the printer's thermal head is probably dirty. Use the thermal head cleaner which is provided with the printer to clean the thermal head. If the thermal head is very dirty, use alcohol.

Clean the thermal head with the thermal head cleaner as follows, and refer to Figures 4-8a to 4-8e below:

1. Open the front cover of the printer. Lift up the green upper-half release lever and lift the upper half of the printer. This automatically turns off the power. Any images already sent to the printer but not yet printed will be lost, and you will need to resubmit them to the printer.

Turn the green thermal head release lever to the left and pull the transfer roll cassette out from the printer. You do not need to remove the cassette entirely.

Figure 4-8a. Pull Transfer Roll Cassette out from Printer.



6467-154

2. Remove the thermal head cleaner from the plastic pouch. One end of the thermal head cleaner has a magnet and two raised plastic locators. The other end has a foam pad.

Slip the end with the foam pad down into the printer so that the foam pad rests against the thermal head. Place the other end of the thermal cleaner, with the magnet and plastic locators, on top of the paper brace. (The paper brace is located directly over the roller knob.) Insert the thermal head cleaner locators into the two holes in the paper brace.

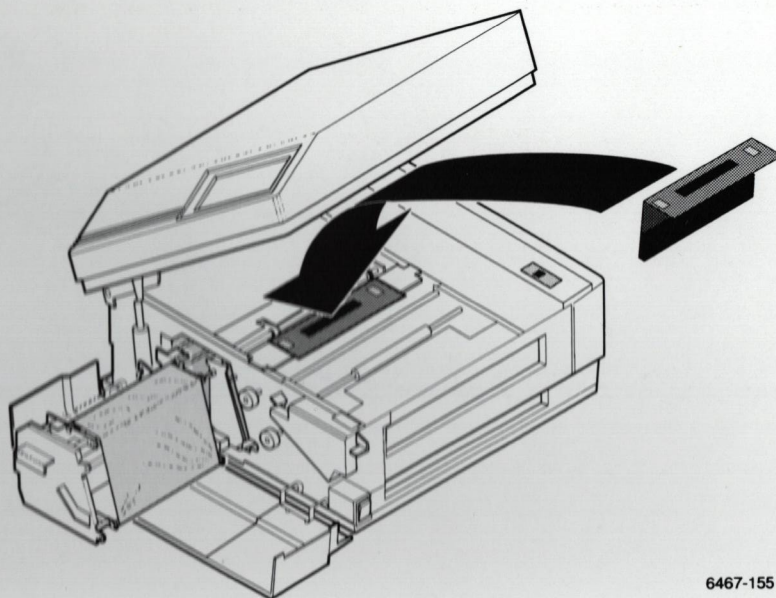
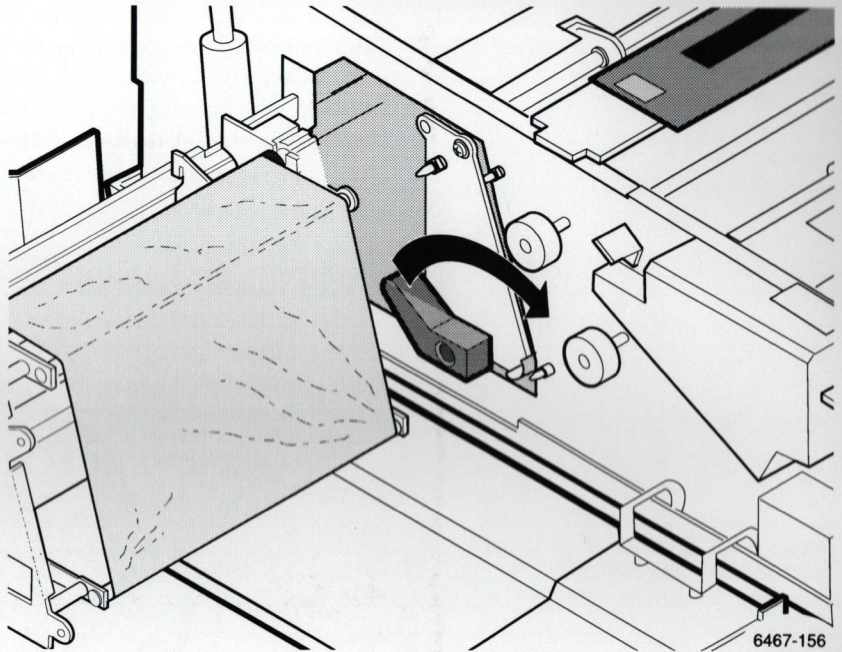


Figure 4-8b. Positioning the Thermal Cleaner Inside the Printer.

6467-155

3. Turn the thermal head release lever to the right so that the thermal head is tight against the thermal head cleaner.

Figure 4-8c. Lock Thermal Head Release Lever.



6467-156

4. Locate the two chrome alignment pins on the inside of the printer, behind the extended transfer roll cassette. The alignment pins go through the front of the transfer roll cassette when it is in its locked position inside the printer. Squeeze these alignment pins together to squeeze the thermal head cleaner more tightly against the thermal head.

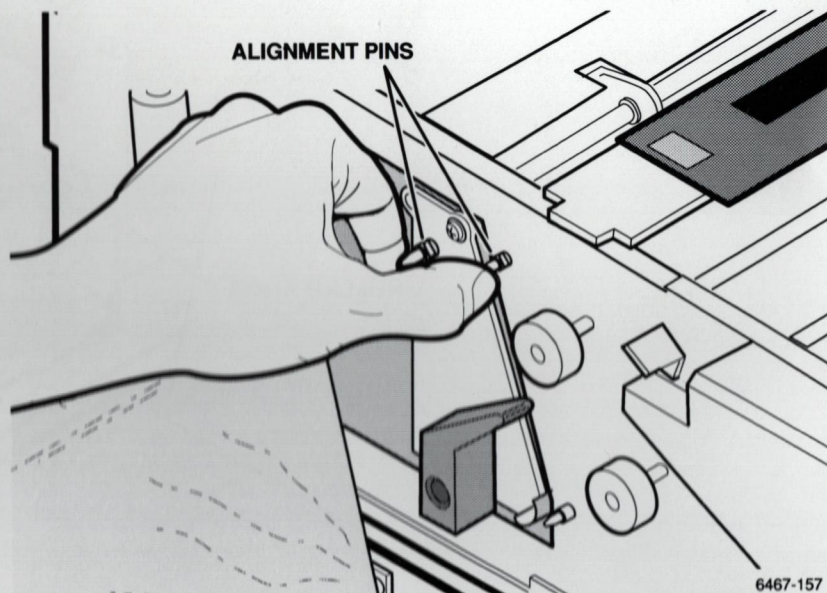


Figure 4-8d. Squeeze Alignment Pins Together.

5. Turn the roller knob back and forth gently about 30 degrees, five to ten times.

Figure 4-8e. Turn Roller Knob Back and Forth.



6467-158

When you are done cleaning the thermal head, remove the thermal head cleaner by turning the thermal head release lever to the left. Push the transfer roll cassette back into the printer, and then turn the thermal head release lever to the right to secure the transfer roll cassette. Close the upper half of the printer and the front cover. Continue operation.

Refer to Figure 4-9 below when cleaning the thermal head with alcohol.

**CLEAN THIS SURFACE
WITH LINT-FREE, ALCOHOL-SOAKED CLOTH**

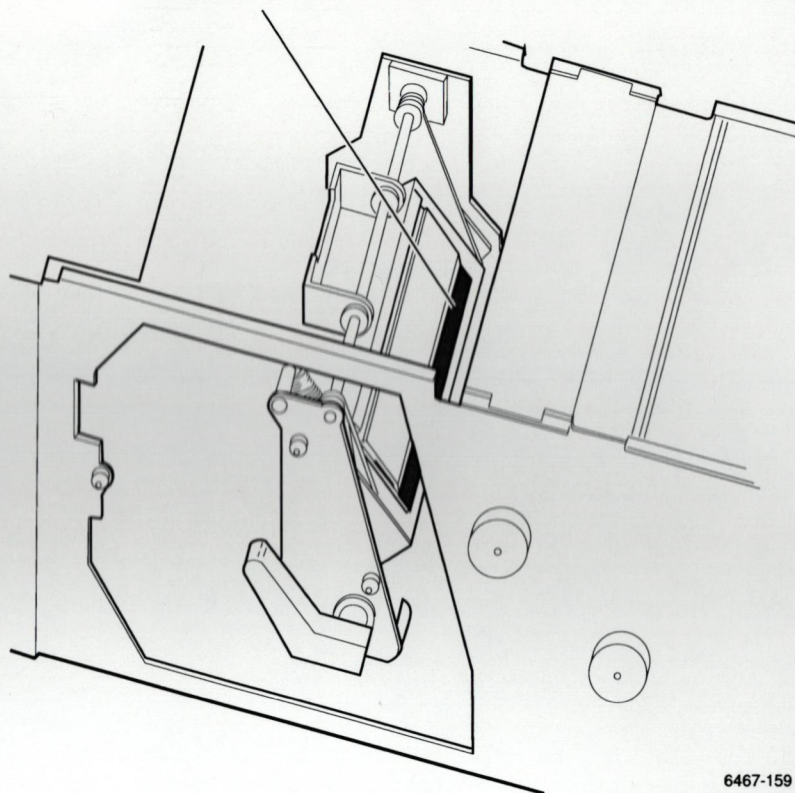


Figure 4-9. Cleaning the Thermal Head with Alcohol.

6467-159

Cleaning the Platen

Refer to the Figure 4-10 below when cleaning the platen.

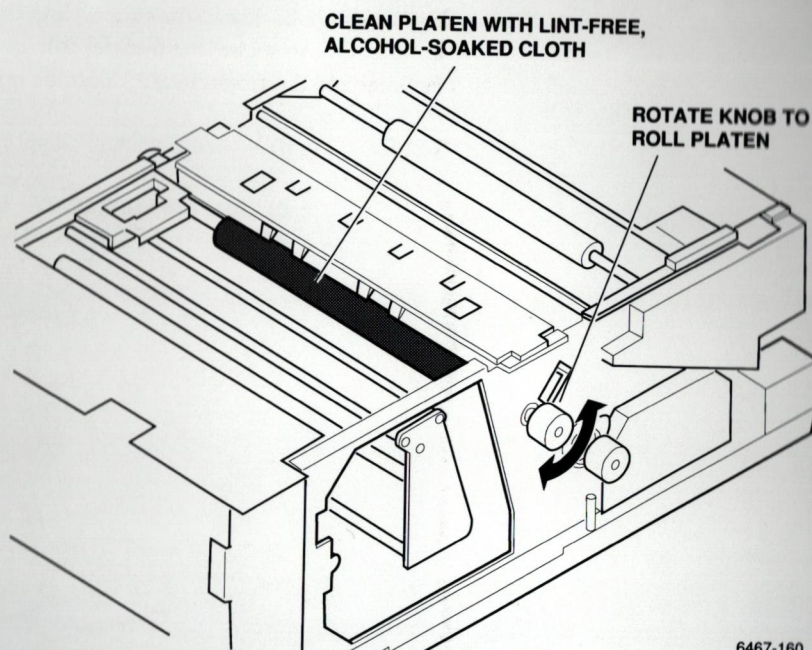


Figure 4-10. Cleaning the Platen.

6467-160

Cleaning Transfer Roll Tension Roller

Refer to the Figure 4-11 below when cleaning the transfer roll tension roller.

REMOVE TRANSFER ROLL.
ROLL STRIP OF ADHESIVE TAPE
ALONG LENGTH OF
TENSION ROLLER.

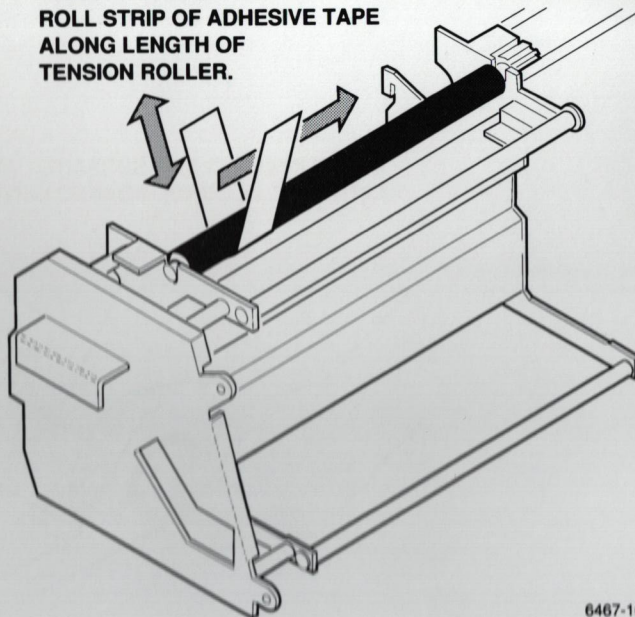


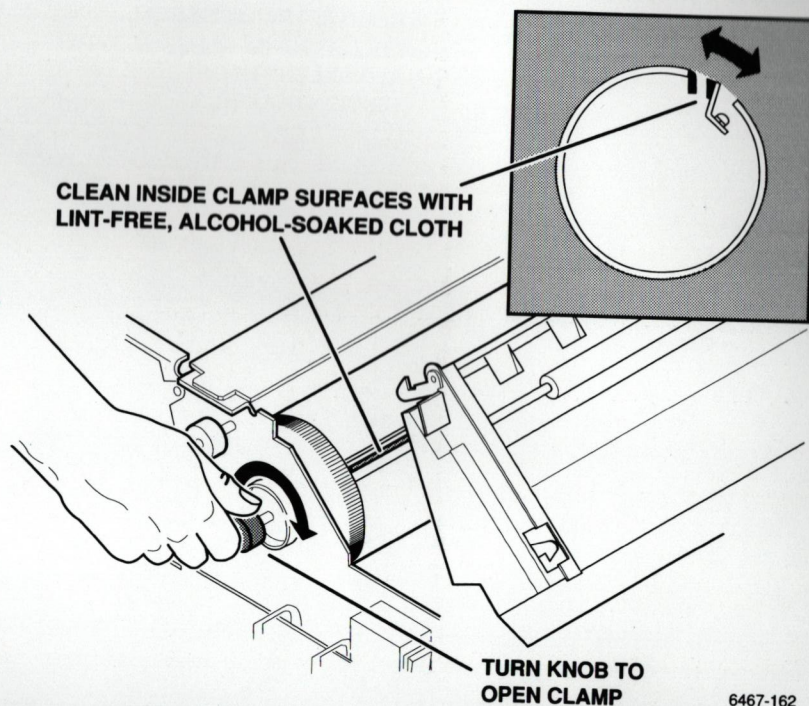
Figure 4-11. Cleaning the Transfer
Roll Tension Roller.

6467-161

Cleaning the Drum Clamp

Refer to the Figure 4-12 below when cleaning the drum clamp.

Figure 4-12. Cleaning the Drum Clamp.



- A** Installation and moving procedure
- B** Front panel windows
- C** Testing and diagnostic procedures
- D** Messages
- E** Terminal hardcopy commands
- F** Using the printer with a 4510A Rasterizer
- G** Specifications
- H** Options, accessories, and supplies
- I** Technical overview of 4693D
- J** Glossary of terms

Appendices

- A** Installation and moving procedure
- B** Front panel windows
- C** Testing and diagnostic procedures
- D** Messages
- E** Terminal hardcopy commands
- F** Using the printer with a 4510A Rasterizer
- G** Specifications
- H** Options, accessories, and supplies
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Installation and moving procedure

This appendix gives information about unpacking and installing the printer. It also has information about moving the printer, and storing it on a short term or long term basis. Refer to Appendix J, *Glossary of Terms*, for definitions of any unfamiliar terms.

Radio and Television Interference Warnings and Information

The following information applies to the 4693D Color Image Printer.

VDE 0871 Class B Warning (for 220V Printers)

NOTICE to the user/operator:

The German Postal Service requires that Systems assembled by the operator/user of this instrument must also comply with Postal Regulation, Vfg. 1046/1984, Par. 2, Sect. 1.

HINWEIS für den Benutzer/Betreiber:

Die vom Betreiber zusammengestellte Anlage, innerhalb derer dies Gerät eingesetzt wird, muss ebenfalls den Voraussetzungen nach Par. 2, Ziff. 1 der Vfg. 1046/1984 genügen.

NOTICE to the user/operator:

The German Postal Service requires that this equipment, when used in a test setup, may only be operated if the requirements of Postal Regulation, Vfg. 1046/1984, Par. 2, Sect. 1.7.1 are complied with.

HINWEIS für den Benutzer/Betreiber:

Dies Gerät darf in Messaufbauten nur betrieben werden, wenn die Voraussetzungen des Par. 2, Ziff. 1.7.1 der Vfg. 1046/1984 eingehalten werden.

FCC Class B Warning (for 110V Printers)

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the computing equipment/printer with respect to the receiver.
- Move the computing equipment/receiver away from the receiver.
- Plug the computing equipment/printer into a different outlet so that the computing equipment and receiver are on different branched circuits.

FCC Class B System Interconnect Requirements (for 110V Printers)

WARNING: this equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J or Part 15 of FCC Rules. Only other computing equipment (computer input/output devices, terminals, etc.) certified or verified to comply with the Class B limits may be attached to this printer. Operation with non-certified or verified equipment is likely to result in interference to radio and TV reception.

The user of this equipment must utilize shielded interconnect cables provided with this product or specified in the manual to insure continued compliance with the Electromagnetic Emissions Limits as stated in Subpart J of Part 15 of FCC Rules.

Unpacking the Printer

The printer and accessories are shipped together in separate boxes.

Unpack the printer in three steps (details follow):

1. Remove the accessories from the small accessory box. (You should have already done this if you are reading this manual.) Be sure to read instructions carefully to install the printer.
2. Remove printer from the shipping carton.
3. Remove the protective packing from inside the printer.

NOTE *Be sure to save the boxes and packaging so that you can reuse them when you store or move the printer.*

Unpacking the Accessory Box

The following standard accessories are shipped with the printer:

- One Tektronix standard parallel interface cable, 10 feet in length.
- One power cord to fit power options ordered with the printer.
- 4693D Color Image Printer Quick Reference Booklet, to be attached to the printer for easy reference.
- 4693D Color Image Printer Operator Manual which describes in detail the operating features of the printer.
- Start-Up Kit. This includes an American or a metric sized paper tray (for American or metric media), a receiving tray, thermal transfer roll, and printing media.

In addition, optional accessories are shipped with the printer.

Removing the Printer from the Box

1. Lift up on the sides of the box to remove the top and sides from the bottom of the box. The printer sits on top of the bottom of the box, and is now easily accessible.
2. Lift the printer out of the bottom of the box.

WARNING Follow normal precautions for lifting heavy weight when removing the printer from the box, since the printer is very heavy.

3. Place the printer on a flat, even surface that you selected for its location.

Removing the Protective Packing

Remove the protective packing as follows, and refer to Figures A-1a and A-1b below.

1. Remove the foam and tape from the front of the printer.
2. Open the printer's front cover.
3. Open the upper half of the printer by pulling up on the upper-half release lever.

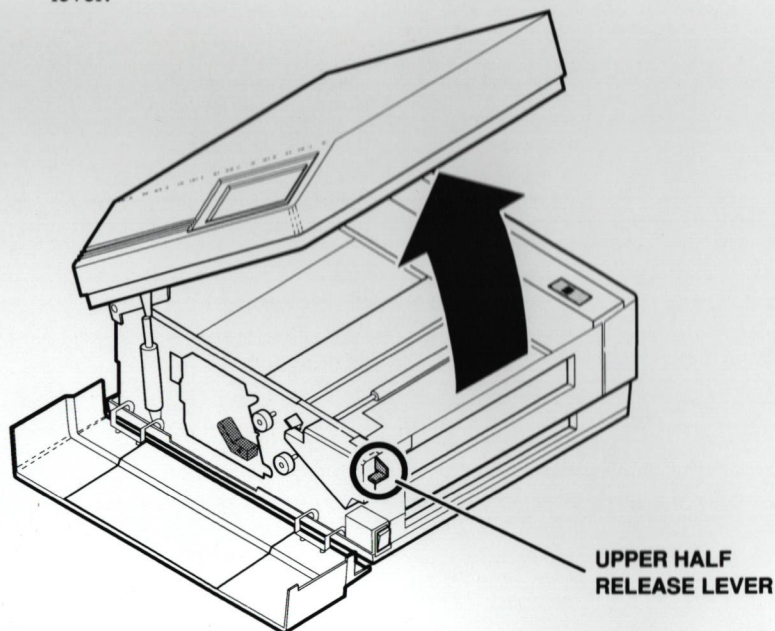
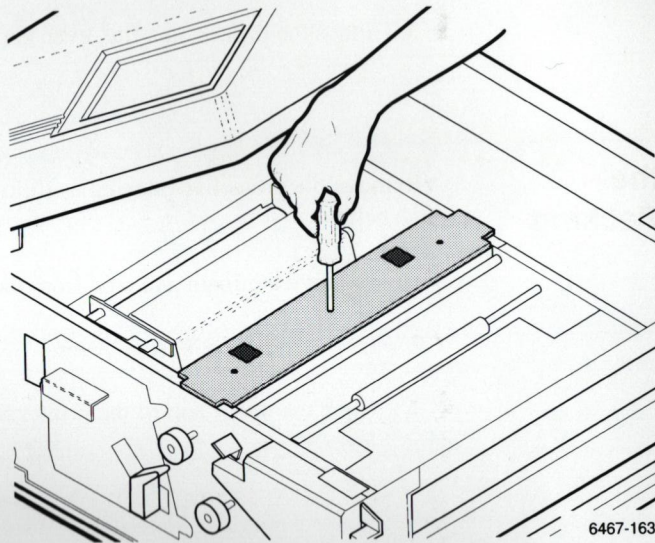


Figure A-1a. Open the Upper Half of the Printer.

6467-150

4. Remove the white cardboard spacer from the paper brace located inside of the printer. To do this, insert a screw driver into the center hole and firmly press down. Position the screw driver so that it does not slide off of the release bar under the paper brace. Carefully pull the spacer out of the four holes on the paper brace, making sure that none of the tongues of the spacer catch in the holes.
5. Close the upper half of the printer, making sure that the cover snaps firmly shut at both the front and the back. Close the front cover and continue with installation procedures.

Figure A-1b. Remove Spacer from the Paper Brace.



6467-163

Installation Precautions

Take the following precautions when installing or moving the printer:

1. Use the correctly rated power source and ground the printer by plugging it into a properly grounded power outlet.
2. Do not place the printer in areas that are humid, in direct sunlight, dusty, poorly ventilated, or subject to extreme temperatures.
3. Place the printer on a firm, level surface.
4. Leave at least four inches between the printer and any walls for proper ventilation.

Installation Overview

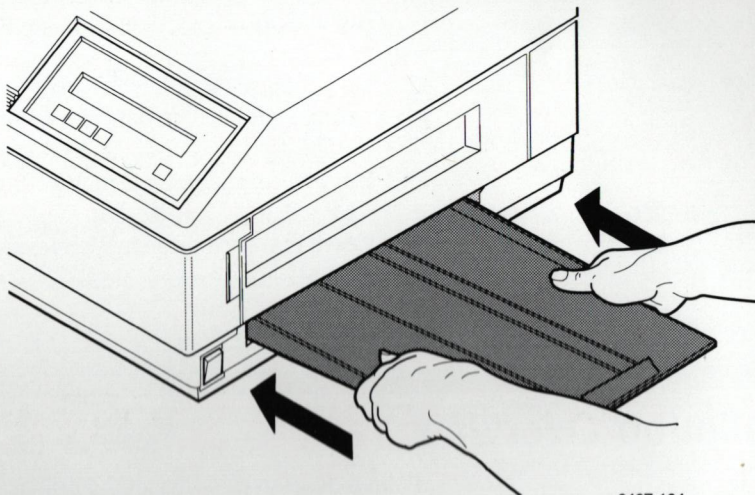
Follow these steps to install the printer (details of each step follow):

1. Insert the copy receiving tray into the printer.
2. Load paper into the paper cassette, and insert the paper cassette into the side of the printer.
3. Load transfer roll into the printer.
4. Change the line voltage selection (if necessary).
5. Plug the printer into the power source and turn on the printer.
6. Run verification tests.
7. Make a test print to assure that the printer is working.
8. Connect the parallel interface cables to the printer and to your terminal (or the device from which you are making prints, such as a rasterizer or a PC).
9. Set the cable termination switches.
10. Set up the printer and terminal using the printer front panel and the terminal hard copy commands.

Step 1: Load the Copy Receiving Tray

The copy receiving tray is shipped in the accessory box. Remove the plastic cover from around the tray. Insert the tray into the bottom slot located at the side of the printer. Lift up on the narrow end of the tray and push the wide end of the tray into the slot. Refer to Figure A-2 below.

Figure A-2. Inserting the Copy Receiving Tray into the Printer.



6467-164

Step 2: Load Paper and Paper Cassette

The paper cassette is shipped in the accessory box. Remove the plastic from around the paper cassette and then remove the tape which holds the smoke colored cassette cover onto the bottom of the cassette. Load paper and paper cassette as follows, and refer to Figures A-3a to A-3e below.

1. Remove the cassette cover from the bottom of the cassette.

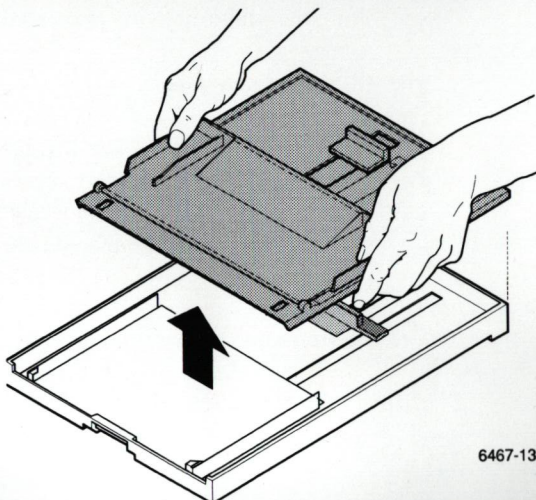


Figure A-3a. Lift off Cassette Cover.

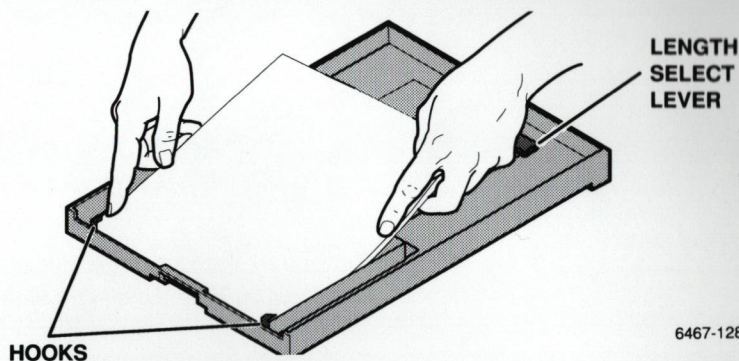
6467-135

2. Place paper or film into the cassette. Fan the new paper or film before placing it into the paper cassette, and then slide it below the hooks located at the inside corners of the paper cassette.

Insert paper so that the whiter and smoother side of the paper is up. Place paper-backed transparency film so that the film side is face up. The cassette will hold approximately 100 sheets of paper or 50 sheets of transparency film.

Adjust the length select lever in the paper cassette to accommodate the length of the media you are loading.

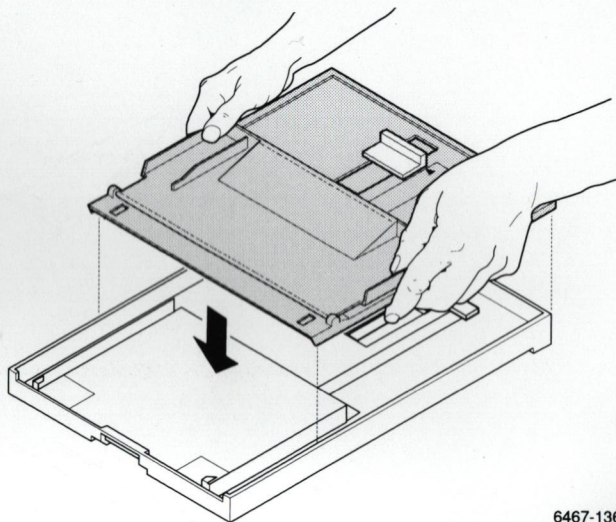
Figure A-3b. Place Media in Paper Cassette.



6467-128

3. Replace the cassette cover. Make sure that the hinged end of the cassette cover (the end that goes into the side of the printer) is opened up so that you can see the media inside.

Figure A-3c. Replace Cassette Cover.



6467-136

4. Adjust the media select lever for either paper or transparencies. Pull the lever out from the printer if you loaded paper; push the lever in toward the printer if you loaded transparencies.

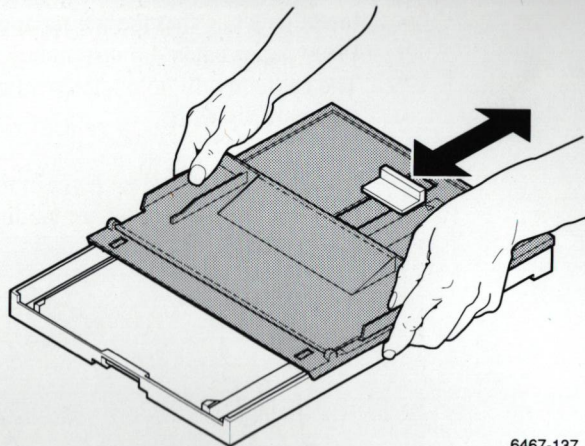


Figure A-3d. Adjust Media Select Lever.

6467-137

5. Insert the cassette into the side of the printer by tilting the outer end up a little and pushing the other end into the printer at a slant.

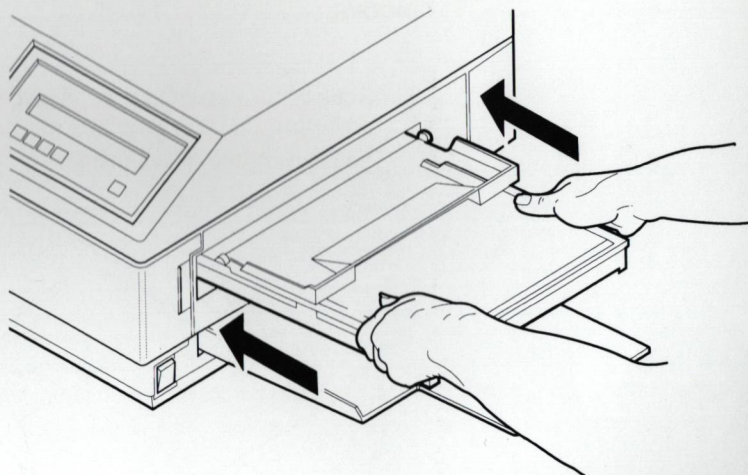


Figure A-3e. Insert Paper Cassette into Printer.

6467-138a

Step 3: Loading Transfer Roll into the Printer

Load the transfer roll into the printer as follows, and refer to Figures A-4a to A-4i below.

1. First remove the transfer roll cassette from the printer. To do this, open the front cover and turn the thermal head release lever 90 degrees to the left (counter clockwise).

**THERMAL HEAD
RELEASE LEVER**

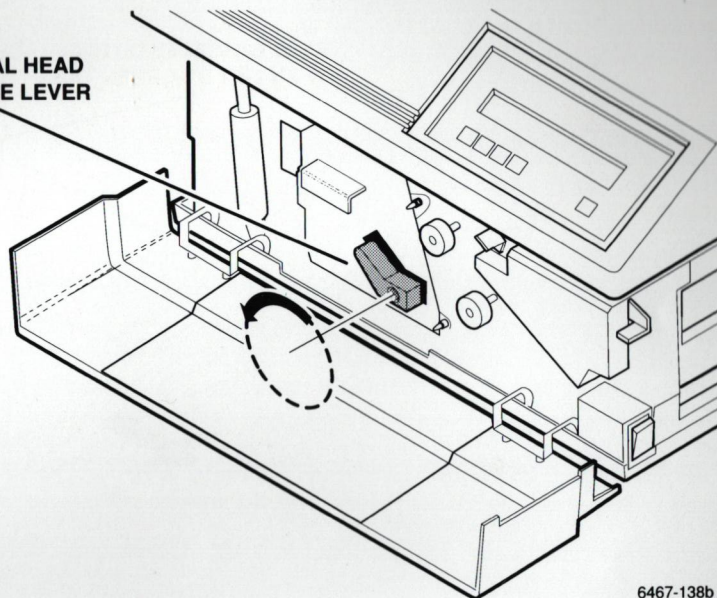


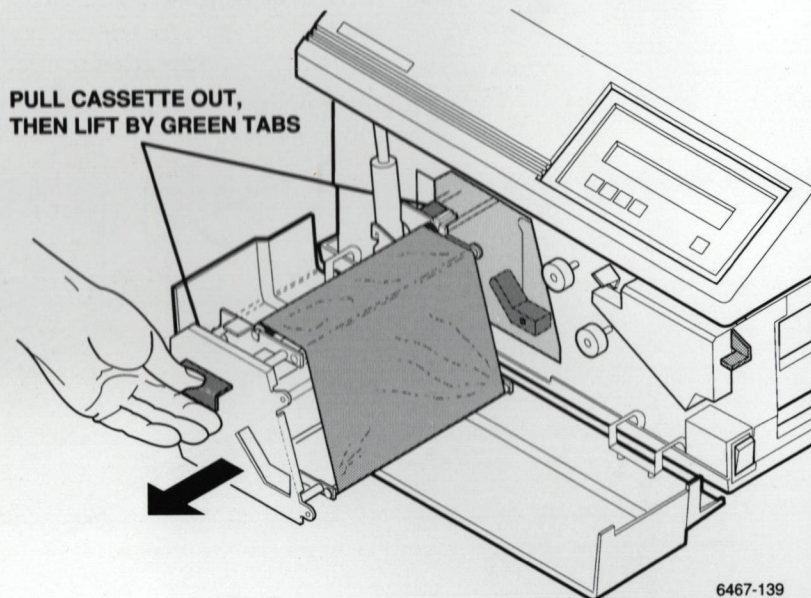
Figure A-4a. Turn Thermal Head Release Lever.

6467-138b

2. Pull the transfer roll cassette gently forward on the printer's slide rail until the cassette stops.

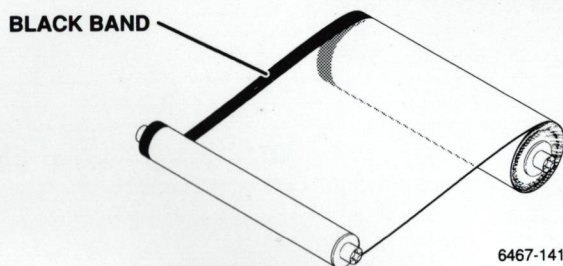
Remove the transfer roll cassette from the printer's slide rail by lifting the green tabs on the cassette up and away from the printer.

Figure A-4b. Remove Transfer Roll Cassette from Printer.



3. Take the transfer roll out of its carton. Unroll a little of the transfer roll onto a clean flat table and notice the black band along one side of the roll.

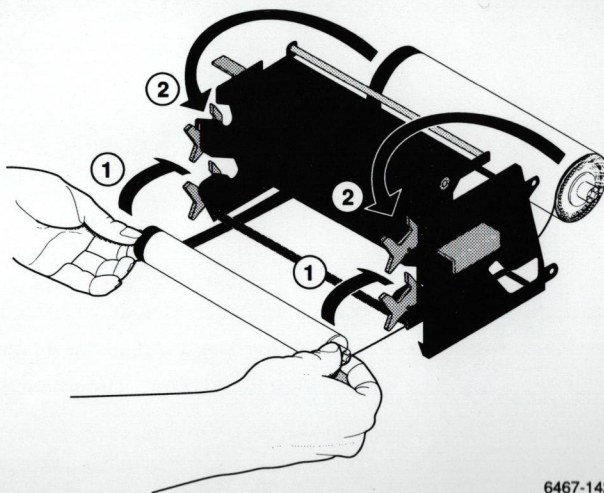
Figure A-4c. Unroll New Transfer Roll.



4. Place the transfer roll cassette on top of the unrolled thermal transfer roll as shown in the illustration. The black band on the roll should be under the back end of the cassette (the side which goes farthest into the printer).

Push down on the green transfer roll holders on the transfer roll cassette so that they are in the released position. Then place the ends of the transfer roll into the green transfer roll holders. First place the smaller (empty end) of the new transfer roll into the bottom holders. Then pull the larger (fuller end) of the transfer roll over the top of the cassette and place it into the upper holders.

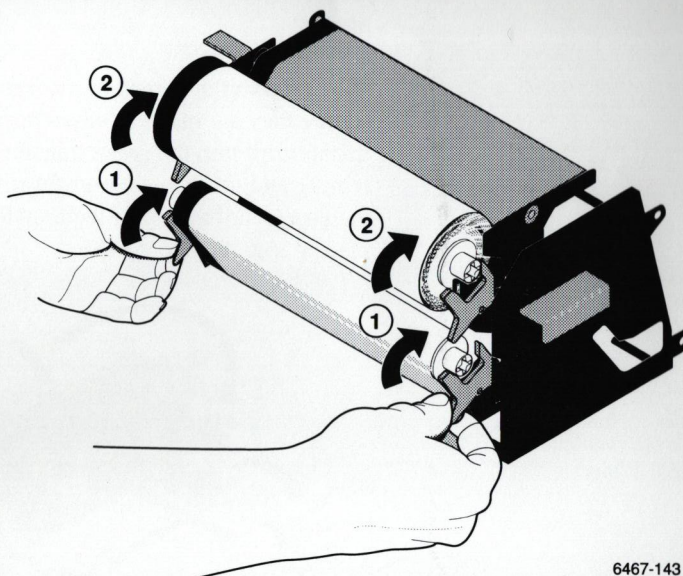
Figure A-4d. Place Transfer Roll Ends into Transfer Roll Holders.



6467-142

5. Turn the green transfer roll holders in the direction shown in the picture to lock the transfer roll in place.

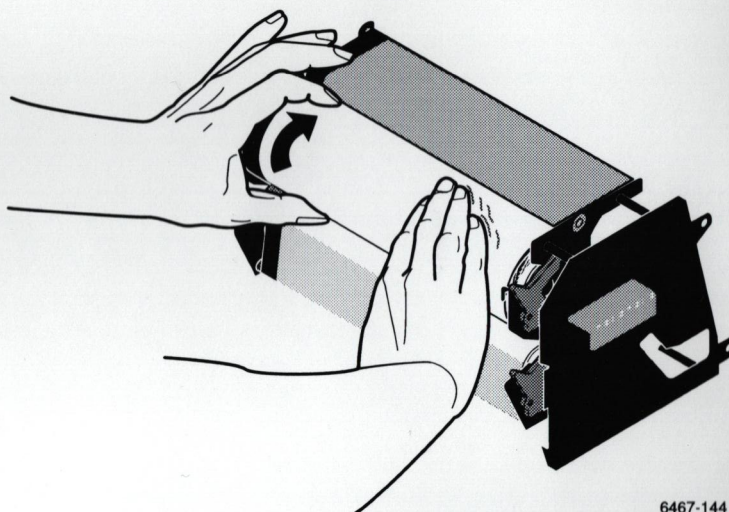
Figure A-4e. Lock Transfer Roll Holders.



6467-143

6. Smooth out any wrinkles on the transfer roll by rotating the upper roll as shown in the picture. The transfer roll must be tight.

Figure A-4f. Tighten Transfer Roll.



6467-144

7. Hook the transfer roll cassette onto the cassette slide rail on the printer.

SLIDE HANGER

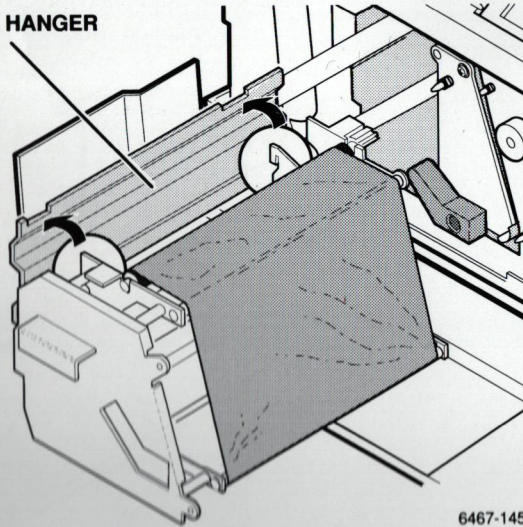


Figure A-4g. Hook Transfer Roll Cassette onto Slide Rail.

8. Carefully push the slide rail and transfer roll cassette into the printer as far as possible.

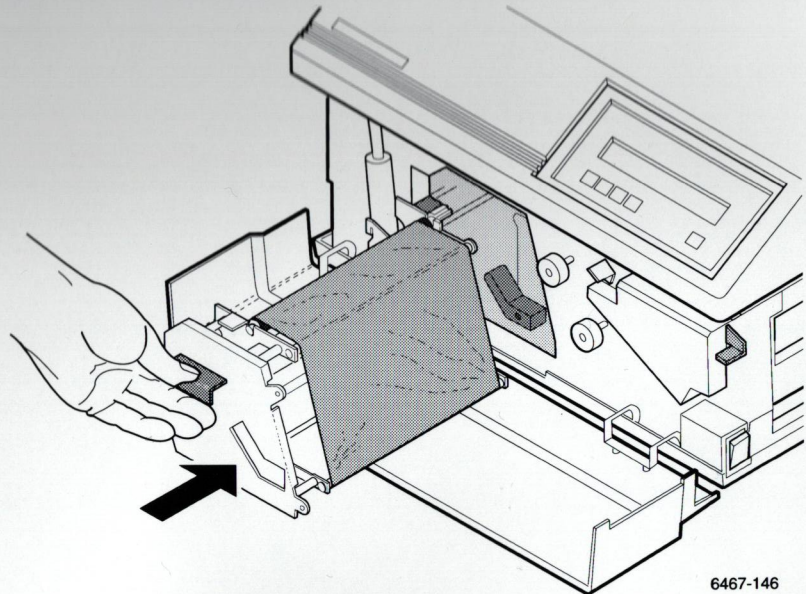


Figure A-4h. Push Transfer Roll Cassette into Printer.

9. Turn the thermal head release lever to the right to lock the transfer roll cassette in place, and close the front cover. Make sure the front cover is securely snapped shut.

**THERMAL HEAD
RELEASE LEVER**

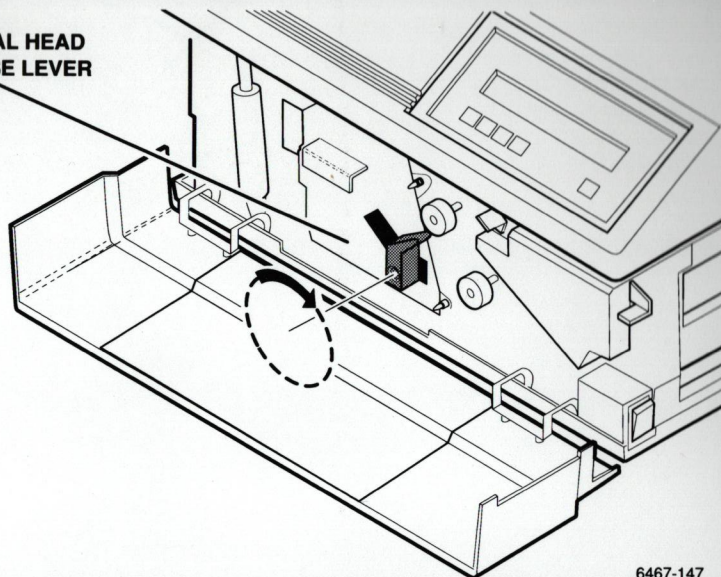


Figure A-4i. Lock Transfer Roll into Printer.

6467-147

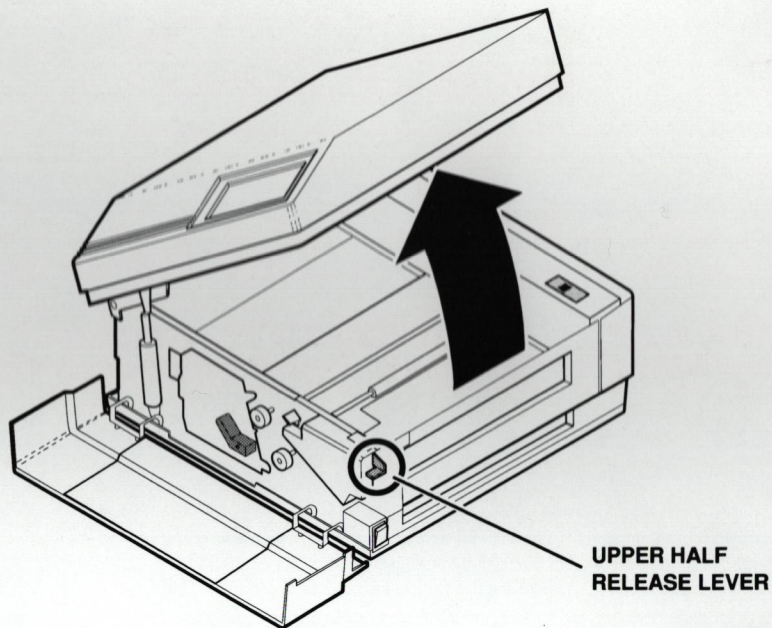
Step 4: Changing the Line Voltage Selection

The printer is equipped with the power option you ordered. You need to change the line voltage selection if you move the printer to a country which uses a different line voltage, as for instance, if you move from the United States to Europe.

To change the voltage selection follow these steps and refer to Figures A-5a and A-5b below.

1. Usually, the printer will not be powered up at this point. However, if the printer is plugged in or turned on, turn off the power switch on the printer and remove the power cable which is now plugged into the printer.
2. Open the front cover to access the upper-half release lever, and then open the upper half of the printer.

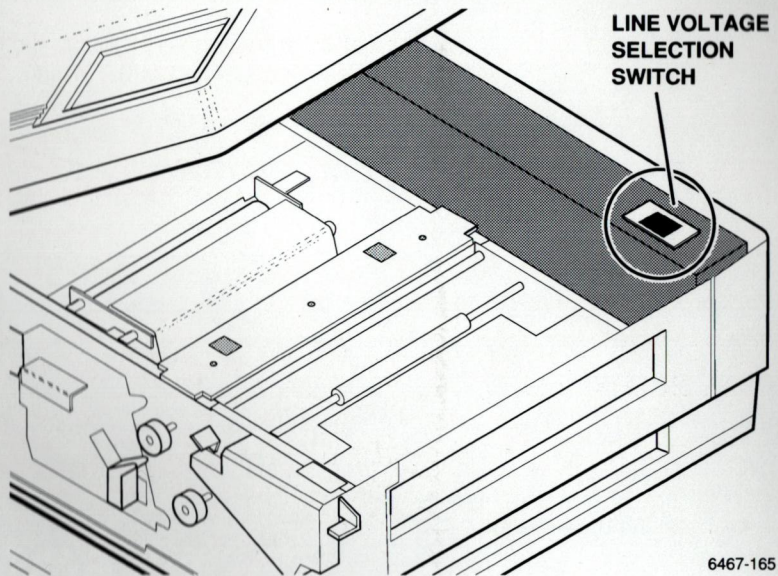
Figure A-5a. Open the Upper Half of the Printer.



6467-150

3. Locate the line voltage selection switch on top of the power supply. The power supply is at the top, against the back panel of the printer.
4. Take off the plastic window above the line voltage selection switch by removing two screws.
5. Change the line voltage selection switch to the new voltage setting using a screw driver.
6. Screw the plastic window back on top of the line voltage selection switch and close the upper half of the printer.

Figure A-5b. Locate Line Voltage Selection Switch.



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Step 5: Powering Up the Printer

Plug in the printer's power cord to the wall outlet, and turn on the printer's power switch (see Figure A-6 below). Powering up the printer starts the power-up test, and then an IDLE message is displayed on the front panel.

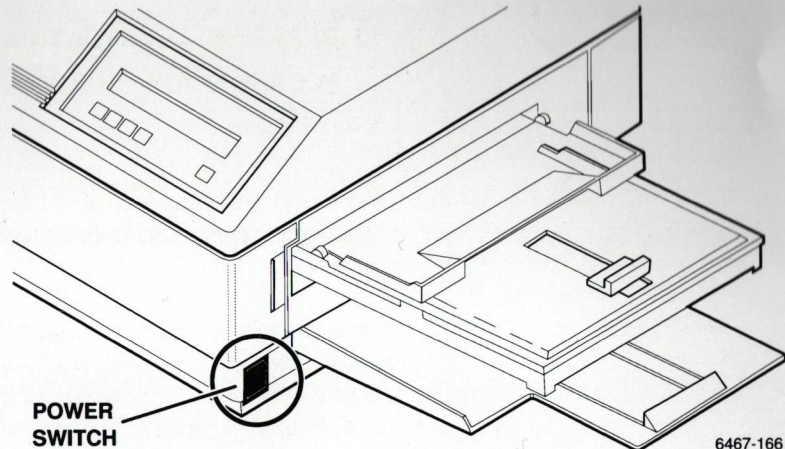


Figure A-6. Turning on the Printer.

Step 6: Running Verification Self Tests

After powering up the printer, run verification self tests. These tests take about two minutes to complete, and assure you that the printer is working correctly. Run the verification self tests as follows and refer to Figures A-7a and A-7b below:

1. First press the front panel PROGRAM key. The IDLE message stops displaying, and the USER IDENTIFICATION window is shown.

Normally, you would enter your user port number on this window. However, for this particular procedure, you do not need to enter a user port number.

Figure A-7a. USER IDENTIFICATION Window

0 IDENTIFY USER BY PORT NUMBER :	
MAKE SELECTIONS FOR USER :	1

6467-167

Figure A-7b. PERFORM VERIFICATION TESTS Window.

2. Press the SCROLL key 12 times to move from window to window until you get to the PERFORM VERIFICATION TESTS window (window 12).

12 PERFORM VERIFICATION TESTS :
ACCESS CODE : 00000

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3. Next, enter your access code of 04693. To do this, press the MOVE key to move the cursor under the second zero of the displayed string of five zeros.

Then press the SCROLL key until the digit 4 appears. Then press MOVE to move the cursor to the third zero, and scroll to display the digit 6. Continue scrolling to display the correct digits until the access code 04693 is displayed. Then press the SELECT button to enter the information into the printer's memory. The verification tests will begin.

As the verification tests progress, the window displays the name and number of the tests which are running. If the test is successful, after the test completes the OPERATIONAL STATUS window displays an IDLE message. You can then go on to the next step, making a test print. If the verification tests are unsuccessful, one of two things may happen:

- One test name continues to be displayed on the window for longer than a minute.
- The front panel displays a message that a test has an error. It also shows the counts of the times this test ran correctly and incorrectly.

If a test name continues to display on the window, press the RESET button and try again. If the test fails a second time, contact a qualified service representative.

If the message appears that a test has an error, write down the name of the test that is displayed in the message and press the RESET button to stop the test. Then contact a qualified service representative.

Sometimes it is possible to print pictures on the printer even though the test failed. If you choose to try this, press SELECT, MOVE, or SCROLL (not PROGRAM or RESET). This action stops the test, and you can try to make a test print. However, even if you are able to make prints, you should still contact the service representative.

Step 7: Making a Test Print

After the verification self test is completed, the IDLE message displays. Request a test print after completing the verification tests.

Make a test print as follows, and refer to Figure A-8a and A-8b below:

1. Press the PROGRAM key. The USER IDENTIFICATION window is displayed.

Normally, you would enter your user port number on this window. However, for this particular procedure, you do not need to enter a user port number.

Figure A-8a. USER IDENTIFICATION Window.

0 IDENTIFY USER BY PORT NUMBER :
MAKE SELECTIONS FOR USER : 1

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2. Use the SCROLL key to cycle the windows 11 times until the PRINT A TEST PICTURE window (window 11) is displayed.

Figure A-8b. PRINT A TEST PICTURE Window.

11 PRINT TEST PICTURE :
*saturation dither

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3. Press the MOVE key to move the cursor to the option field (shown in lowercase letters on the second line).
4. Cycle through the options using the SCROLL key until the desired test pattern selection is displayed.
5. Press SELECT to enter the information into the printer's memory. The printer begins printing the test pattern, and the PRINT TEST PICTURE window continues to display. When you are done making all test prints, press the PROGRAM key to return to the OPERATIONAL STATUS window.

For details on the PRINT A TEST PICTURE window, see Appendix B, *Front Panel Windows*.

If the test is successful, the printer prints the test pattern. The fact that the test picture prints tells you that the printer is working. However, by looking at a

test print, a qualified service representative can tell if there are any specific problems with the the printer.

If the test picture prints, but it shows obvious problems, run the test again. If the same problem occurs, call a qualified service representative.

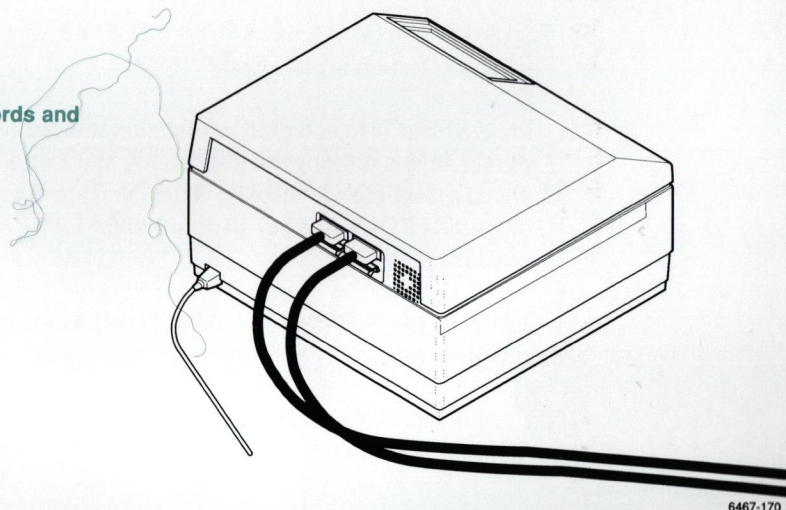
If the test picture does not print, an error message will appear on the front panel. If the message tells you to load paper, or that the paper is jammed, or some other user maintenance task, do the task it asks you to do. If the message says "printer failure", write down the number which is displayed on the window. Reset the printer and try again. If the same error occurs, call a qualified service representative.

Step 8: Attaching Cords and Cables

Once you are assured that the printer is working correctly, attach the printer to the terminal. Connect the parallel interface cables to the back of the printer as shown in Figure A-9. There are two types of parallel interface cables available. A standard 36-pin to 36 pin cable connects the printer to a workstation, terminal, or host computer. An optional 36-pin to 25-pin cable connects the printer to a personal computer.

Connect the other end of the cable to the terminal, personal computer or other device to which you are connecting the printer. Consult the source device's documentation for specific instructions. The standard printer has only one port; if you have the multiplex option, the printer has four ports. Be sure to note the name of each port's user on the 4693D Quick Reference Booklet which is attached to the printer.

Figure A-9. Attaching Cords and Cables.



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Step 9: Setting Cable Termination Switches

The printer can be connected using several different interface configurations.

- Tektronix parallel interface with only series termination:
 - Tektronix 4510A and CX4510A Rasterizers
 - Tektronix 4100, 4200, and 4110, Series Terminals
- Tektronix parallel interface with only parallel termination:
 - Tektronix 4510 Rasterizers
 - Tektronix 4115 Terminals
 - SUN Workstations with IKON Hardcopy Interface (recommended termination)
- Tektronix parallel interface with either series or parallel termination:
 - Tektronix 4120
 - Tektronix 4220 and 4230 Series Terminals
- Non-Tektronix parallel interfaces:
 - IBM compatible AT personal computers with a parallel adapter.

NOTE *If you are connecting a 4120 Series Terminal, the termination you use requires configuration at the terminal (see terminal documentation for information). The 4220 and 4230 Series Terminals require no special configuration at the terminal to accommodate termination.*

The DIP switches located on the printer set the printer ports for TPI (series termination), TPI (parallel termination) or for non-Tektronix parallel interfaces. One printer can be connected to any combination of host types; each port can have a different type of connection.

Each of the ports has a group of DIP switches for host-to-printer signal lines and another group of DIP switches for printer-to-host signal lines. All of the DIP switches for a single port are usually set the same.

Deciding to use Parallel or Series Termination

If a TPI type host can be set to either series or parallel termination, follow these guidelines in deciding how to set the DIP switches:

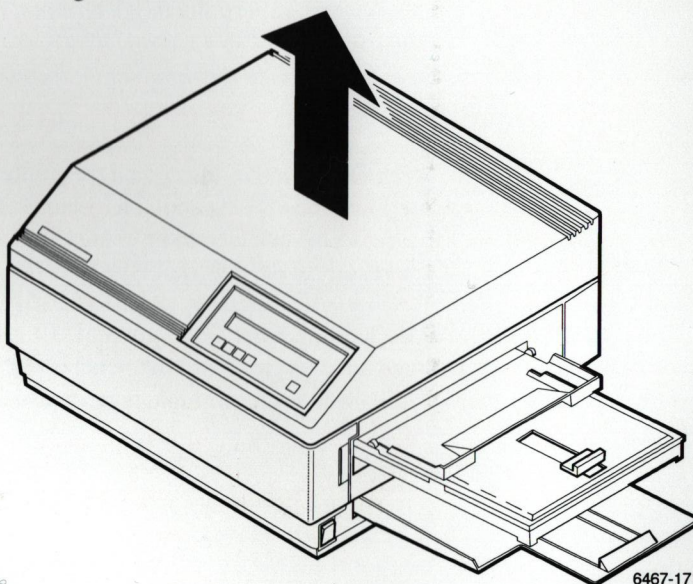
- Set for series termination when the cable is up to 10 meters in length, and when the host cannot drive the 100 ohm load.
- Set for parallel termination for all cables over 10 meters and up to 30 meters in length. Parallel termination requires that the host be able to drive the 100 ohm load to at least 2.4 volts.

Setting Switches

The DIP switches are set at the factory to series termination. If you need to set the DIP switches to parallel termination, set them as follows:

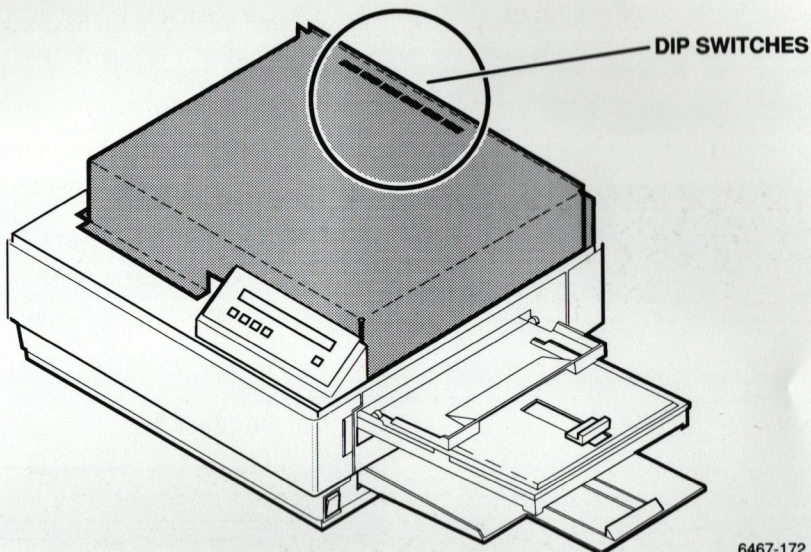
1. Turn off the power switch on the printer.
2. The DIP switches are located on the printer's upper half. Access the DIP switches by removing the cover of the upper half of the printer by lifting straight up as shown in Figure A-10a. Do not lift the hinged upper half of the printer using the upper-half release lever. You are only removing the cover from the upper half. The location of the DIP switches is shown in Figure A-10-b.

Figure A-10a. Removing the Upper Half Cover.



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Figure A-10b. Locating the DIP Switches.



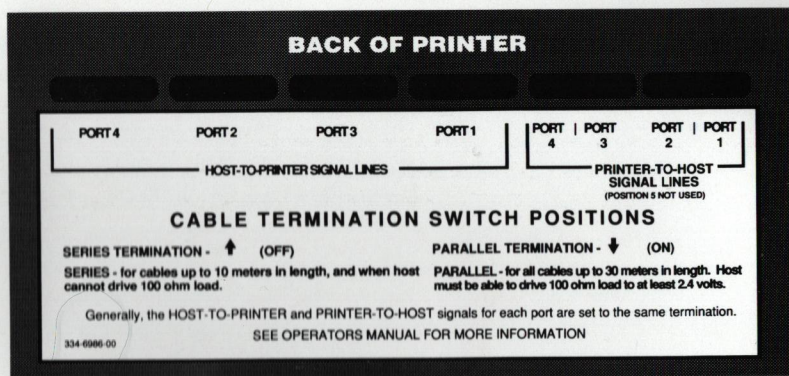
6467-172

3. Change the DIP switches as shown in Figure A-10c for either parallel or series termination.

Set the switches to OFF for Tektronix parallel interface with series termination, or for non-Tektronix parallel interface termination.

Set the switches to ON for Tektronix parallel interfaces with parallel termination.

Figure A-10c. Cable Termination Switch Positions.



SET TO ↑ (OFF)

For: • Tektronix Parallel Interface having series (reverse) termination.

• Non-Tektronix printer Interface termination.

SET TO ↓ (ON)

For: Tektronix Parallel Interface having parallel (forward) termination.

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4. The configuration of each host-to-printer and each printer-to-host DIP switch is shown in Figure A-10d, below.

HOST-TO-PRINTER SWITCH CONFIGURATION

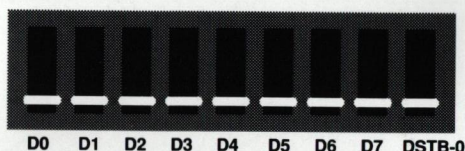
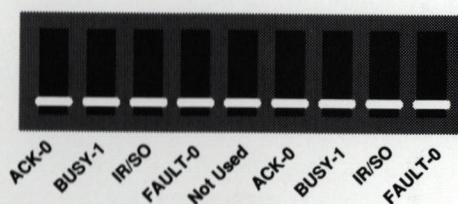


Figure A-10d. Switch Configurations.

PRINTER-TO-HOST SWITCH CONFIGURATION



BACK OF PRINTER

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Step 10: Setting up the Printer and Terminal

The final step in installation is to set up the printer and the terminal. Before making any prints of terminal screen images, both the printer and the terminal must be configured correctly. This sets up both the printer and the image source so that images can be correctly transmitted to the printer, and so the printer prints the images following the desired set of parameters. Refer to Section 2, *Preparing to Make a Print*, which explains this setup procedure.



Moving the Printer

To move the printer a short distance such as from one desk to another in the same building:

1. Turn off the printer.
2. Unplug the cables.
3. Remove the paper cassette and paper tray.
4. Move the printer to the new location. You may need to place the printer on a cart or have someone help you carry it. Be sure to keep it level.

To move the printer a long distance such as from one building to another where you might place the printer in a car or van:

1. Turn off the printer.
2. Unplug the cables.
3. Remove the paper cassette and paper tray.
4. Place the spacer back into the holes in the paper brace by inserting a phillips screwdriver into the hole in the center of the paper brace as shown in Figure A-11.
5. Repack the printer into its shipping box.

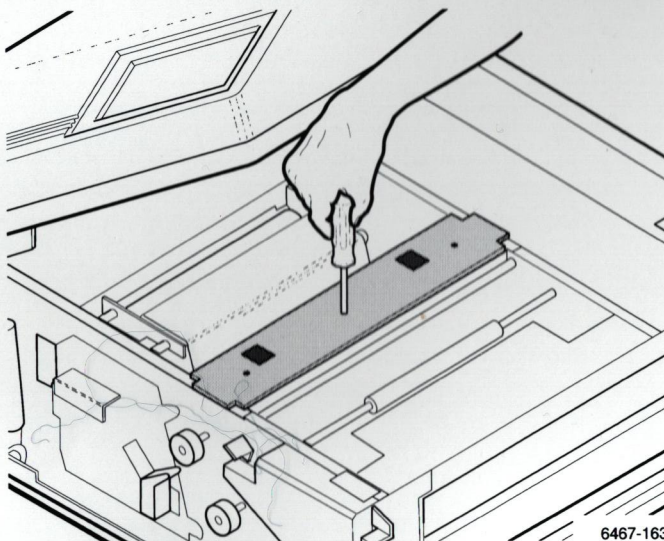


Figure A-11. Insert Spacer into Paper Brace.

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Storage

No special procedures are needed when storing the printer for short periods of time. Store supplies for short periods of time as follows:

1. Store supplies where it is dry, clean, and kept at an even temperature. Do not expose to direct sunlight.
2. Store media in the wrapper lying flat. Storing media packages standing up or out of the wrapper may curl or dampen the sheets, which can cause misfeeds.

When storing the printer for long periods of time, follow the same guidelines above, and in addition, do the following:

1. Remove the thermal transfer roll from the printer.
2. Remove the paper cassette and the output tray.



Front panel windows

Appendix B contains details about each of the interactive front panel windows; refer to this appendix when setting printer parameters. For instructions on how to operate the front panel keys and windows, see Section 2, *Setup Instructions*. This appendix does not cover error and message windows; refer to Appendix D, *Messages*, for details on those exception windows. Refer to Appendix J, *Glossary of Terms*, for explanations of any unfamiliar terms in this appendix.

Figure B-1 shows all the front panel interactive windows and the order they scroll. This appendix explains the windows in the same order.



Figure B-1. Front Panel Windows.

0 IDENTIFY USER BY PORT NUMBER:

1 COPY LAST PICTURE PRINTED:

2 SELECT MEDIA TYPE: PRINT ON

- loaded media
- letter sized paper
- legal sized paper
- transparency

3 SELECT GRAPHICS APPLICATION MODE:

- color pie charts, bar graphs
- color line drawings / text
- color shaded solids / images
- color schematics
- monochrome pie charts, bar graphs
- monochrome line drawings / text
- monochrome shaded solids / images
- monochrome schematics
- Tektronix 4510 special graphics mode
- user defined imaging options (accesses 3a, 3b, 3c, and 3d)

3a SELECT COLOR PALETTE: PRINT USING

- full color 1
- full color 2
- eight primary colors
- gray shading
- black and white only

3b SELECT PICTURE SIZING METHOD:

- maximize by interpolation
- increase by replication
- do not enlarge

3c SELECT PRINTER COLOR ADJUSTMENT:

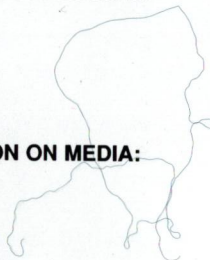
- do not adjust
- perform printer gamma correction
- perform terminal color matching

3d SELECT VIDEO COLOR CORRECTION:

- do not adjust
- adjust to 2.2 standard
- adjust to 2.4 standard
- adjust to 2.6 standard
- adjust to 2.8 standard

4 SELECT PICTURE POSITION ON MEDIA:

- landscape - centered
- portrait - centered
- portrait - top
- portrait - bottom



6467-175a

Figure B-1 continued. Front Panel Windows.

5 SELECT BACKGROUND COLOR EXCHANGE:

print colors as received
exchange black with white
exchange specific color indexes

5a SPECIFY COLOR INDEXES TO EXCHANGE:

EXCHANGE 0000 COLOR WITH 0000 COLOR

6 SET INTERFACE COMPATIBILITY MODE:

Tektronix 4693D printer
Tektronix 4692 printer
parallel printer

7 SET TERMINAL ABORT MEANING:

abort picture printing
print partial picture

8 SPECIFY TERMINAL PIXEL ASPECT RATIO:

PIXELS ARE 32 HIGH BY 32 WIDE

9 SELECT PAPER SYSTEM:

American
metric

10 DISPLAY PRINTER CONFIGURATION:

vol.00-00, 12 mega-bytes, 4 ports

11 PRINT TEST PICTURE:

saturation dither
rag patch pattern
alignment pattern

12 PERFORM VERIFICATION TESTS:

ACCESS CODE : 00000

13 PERFORM SERVICE TESTS:

ACCESS CODE : 00000

6467-175b

OPERATIONAL STATUS

The OPERATIONAL STATUS window displays the current operation status of the printer. The status window fields cannot be altered. It is the default display, and always displays except when users set printer parameters in interactive mode, or when an error or warning message is being displayed. To enter the interactive mode from this window, press the program key.

This window shows each job's place in queue before it is printed. The job is indicated by port number. The jobs are displayed so that the oldest job (first job sent) is rightmost at each position (or field) on the display.

- **RECEIVING:** indicates that the job is being or has been received, but not yet imaged.
- **IMAGING:** indicates that the job is being imaged, or has been imaged and is waiting to be printed.
- **PRINTING:** indicates that the job is currently being printed.
- **COPIES:** indicates the number of copies being printed for the current job.
- **IDLE:** indicates that there is no activity at the printer.

Parameter Choices

No parameters are set on this window.

Figure B-2. OPERATIONAL STATUS Window.

RECEIVING				IMAGING				PRINTING				COPIES
1	2	3	4	1	2	3	4	1	2	3	2	00001
IDLE												

6467-104

0 USER IDENTIFICATION

When you press the PROGRAM key while the OPERATIONAL STATUS window is displaying, the USER IDENTIFICATION window displays first. You must enter the user port number for your host/terminal on this window before entering any printer parameters on other front panel windows. Your port number should be identified at installation and recorded at the printer.

Parameter Choices

- MAKE SELECTIONS FOR USER: Scroll to the correct user port number to indicate which port parameters will be set. After entering this information, access the interactive windows to program the printer.

Figure B-3. 0 USER IDENTIFICATION Window.

0 IDENTIFY USER BY PORT NUMBER :	
MAKE SELECTIONS FOR USER :	1

6467-167

1 COPY LAST PICTURE ENTERED

This window provides the means for requesting a reprint (or reprints) of the last image printed. Users may only request reprints of images which have already been sent to the printer, and which are still in the printer's memory.

If the printer no longer has the image in memory, the message "no picture available for reprint" will be displayed when the window is scrolled.

After successfully requesting a reprint, the window displays the message "picture is now queued for printing".

Occasionally the printer will lock for a few seconds before it can queue the request. When this happens, the message "printer queue is momentarily busy" appears for a short time, followed by the message "picture is now queued for printing" when the printer unlocks.

Parameter Choices

- **NUMBER OF COPIES:** Scroll each of the two digit places to enter the desired number of reprints (up to 99 reprints). Then press the SELECT key to start the reprint.

Figure B-4. 1 COPY LAST PICTURE
PRINTED Window.

1 COPY LAST PICTURE PRINTED :	
MAKE 01 ADDITIONAL PRINTS	

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2 SELECT MEDIA TYPE

The SELECT MEDIA TYPE window is used to specify the type of media on which the job will print. If the media selected is different from the preceding job, the user needs to load the correct media into the printer before the job prints. (Refer to the topics "Making Prints on Paper", and "Making Transparencies" in Section 3, *Operating Procedures*, of this manual.)

The printer sizes prints by following parameters set on both the SELECT MEDIA TYPE window and the SELECT PAPER SYSTEM window (which sets media width to either American or metric media sizes).

Parameter Choices

- **LOADED MEDIA:** tells the printer to print on whatever media is loaded when the job is ready to print.
- **LETTER SIZED PAPER:** tells the printer to print on letter sized paper. If American system media was selected on the SELECT PAPER SYSTEM window, the image prints on A size paper. If using metric system paper, this is A4 size.
- **LEGAL SIZED PAPER:** tells the printer to print on legal size paper if American system media was selected on the SELECT PAPER SYSTEM window. The image prints on A4 Special size if using metric system media.
- **TRANSPARENCY:** sets the printer up to print on letter sized transparencies. If American system media was selected on the SELECT PAPER SYSTEM window, the image prints on A size transparencies. If using metric system media, it prints on A4 size transparencies.

Figure B-5. 2 SELECT MEDIA TYPE Window.

2 SELECT MEDIA TYPE :
PRINT ON *loaded media

6467-176

3 SELECT GRAPHICS APPLICATION MODE

The SELECT GRAPHICS APPLICATION MODE window provides a shortcut method of setting groups of imaging and printing parameters that are appropriate for most applications. Using this window, select the option that describes the type of graphics most commonly printed in your application (refer to Figures 2-6a to 2-6h below).

If you need to set individual imaging parameters for an application, you may do so using windows accessed when the "user defined imaging option" is selected.

The printer works at two speeds. The lowest speed allows time for the print head to cool slightly during printing, providing the highest quality printed colors; the printer's high speed does not provide cooling time for the print head, and printed colors are slightly lower in quality. For most images, the print quality is about same between high speed and low speed printing. When your image has very exact colors, low speed is recommended. The options listed below are all printed at high speed except for the COLOR SHADED SOLIDS/IMAGES, and MONOCHROME SHADED SOLIDS/IMAGES, which are printed at low speed.

Figure B-6a.3 SELECT GRAPHICS APPLICATION MODE Window.

3 SELECT GRAPHICS APPLICATION MODE :
*color pie charts, bar graphs

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Parameter Choices

Select the option that describes your most commonly printed graphics:

- **COLOR PIE CHARTS, BAR GRAPHS:** prints images with a full color palette at highest print speed. This color palette arrives at black by printing a composite of magenta, cyan, and yellow inks. This setting uses interpolation to enlarge the image to fit the media. See below for an example image which should be printed using this setting.

Figure B-6b. COLOR PIE CHARTS, BAR GRAPHS.

- full color
- sized by interpolation
- fastest print speed



3 SELECT GRAPHICS APPLICATION MODE :

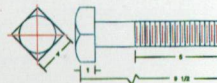
***color pie charts, bar graphs**

6467-112

- **COLOR LINE DRAWINGS/TEXT:** prints simple color line drawings and pictures containing text. Pictures are printed at highest print speed using eight colors with no dithering. This setting enlarges images using replication, which creates clear, solid lines of a uniform width, and ensures that proportions are true. Below are example images which should be printed on this setting.

Figure B-6c. COLOR LINE DRAWINGS/TEXT.

- 8 color
- sized by replication
- fastest print speed



Colored Text
ABCDEFGHIJKLMN
abcdefghijklmn
OPQRSTUVWXYZ
opqrstuvwxyz
1234567890

3 SELECT GRAPHICS APPLICATION MODE :

***color line drawings / text**

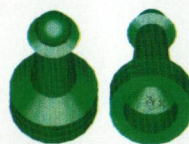
6467-113

- **COLOR SHADED SOLIDS/IMAGES:** This setting prints complex solids and three dimensional diagrams using a full color palette of over 16 million colors by means of dithering. It creates black by printing a composite of magenta, cyan, and yellow inks. It prints the image at slower print speed for highest quality color. The image is enlarged by means of interpolation.

The dither patterns used can produce a broken line if the line is not a pure color, or saturated black or white. Interpolation can produce lines of varying width, or create slight variations in proportion. Therefore, this setting is best suited for printing solids with many different shades of color, like the examples below.

Figure B-6d. COLOR SHADED SOLIDS/IMAGES.

- full color
- sized by interpolation
- highest print quality



3 SELECT GRAPHICS APPLICATION MODE :

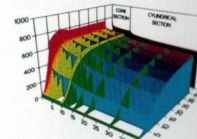
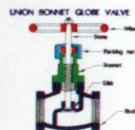
***color shaded solids / images**

6467-114

- **COLOR SCHEMATICS:** This prints complex diagrams which require full color. Prints images at a high print speed using the full color palette of over 16 million colors using dithering, and creates black by printing a composite of magenta, cyan, and yellow inks. Images are enlarged using replication, which ensures that lines have a uniform width, and proportions remain true. The figure below shows the type of image which should be printed using this setting.

Figure B-6e. COLOR SCHEMATICS.

- full color
- sized by replication
- fastest print speed



3 SELECT GRAPHICS APPLICATION MODE :

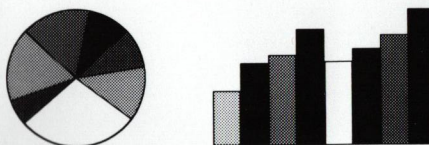
***color schematics**

6467-115

- **MONOCHROME PIE CHARTS, BAR GRAPHS:** This prints business type graphics using 256 shades of grey at the higher print speed, and enlarges images using interpolation. See below for an example image which should be printed using this setting.

Figure B-6f. MONOCHROME PIE CHARTS, BAR GRAPHS.

- 256 grey shades
- sized by interpolation
- fastest print speed



3 SELECT GRAPHICS APPLICATION MODE :

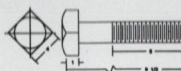
***monochrome pie charts, bar graphs**

6467-116

- **MONOCHROME LINE DRAWINGS/TEXT:** This setting prints simple line diagrams and images with text at the higher print speed using black and white only. This setting enlarges images using replication, which creates clear, solid lines of a uniform width, and ensures that proportions are true. Below are example images which should be printed on this setting.

Figure B-6g. MONOCHROME LINE DRAWINGS/TEXT.

- black & white
- sized by replication
- fastest print speed



Text
 ABCDEFGHIJKLMN
 abcdefghijklmn
 OPQRSTUVWXYZ
 opqrstuvwxyz
 1234567890

3 SELECT GRAPHICS APPLICATION MODE :

***monochrome line drawings / text**

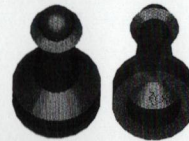
6467-117

- **MONOCHROME SHADED SOLIDS/IMAGES:** This setting prints complex and detailed images using dithering to create 256 shades of grey. This option enlarges images using interpolation. It prints the image at slower print speed for highest print quality

The dither patterns used can produce a broken line if the line is not saturated black or white. Interpolation can produce lines of varying width, or create slight variations in proportion. Therefore, this setting is best suited for printing solids with many different shades, like the examples below.

Figure B-6h. MONOCHROME SHADED SOLIDS/IMAGES.

- 256 grey shades
- sized by interpolation
- highest print quality



3 SELECT GRAPHICS APPLICATION MODE :

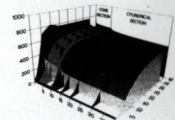
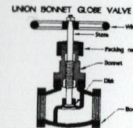
***monochrome shaded solids / images**

6467-118

- **MONOCHROME SCHEMATICS:** This setting prints complex diagrams at the higher print speed in 256 shades of grey arrived at with dithering. Images are enlarged using replication, which ensures that lines have a uniform width, and proportions remain true. The figure below shows the type of image which should be printed using this setting.

Figure B-6i. MONOCHROME SCHEMATICS.

- 256 grey shades
- sized by replication
- fastest print speed



3 SELECT GRAPHICS APPLICATION MODE :

***monochrome schematics**

6467-119

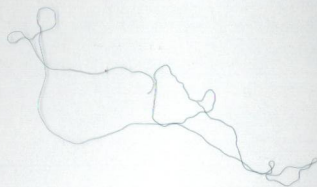
-
- **TEKTRONIX 4510 SPECIAL GRAPHICS MODE:** This setting prints images from the Tektronix 4510 Rasterizer. All imaging is performed by the 4510.
 - **USER DEFINED IMAGING OPTIONS:** This selection accesses additional windows (**SELECT COLOR PALETTE**, **SELECT PICTURE SIZING METHOD**, **SELECT PRINTER COLOR ADJUSTMENT**, and **SELECT VIDEO COLOR CORRECTION**). These windows enable users to individually select imaging parameters.

3A SELECT COLOR PALETTE

This window is a nested window only accessed when the "user defined imaging options" option is selected on the SELECT GRAPHICS APPLICATIONS MODE window (window 3). This option controls the manner in which color or monochrome images will be printed.

The printer works at two speeds. The lowest speed allows time for the print head to cool slightly during printing, providing the highest quality printed colors; the printer's high speed does not provide cooling time for the print head, and printed colors are slightly lower in quality. For most images, the print quality is about same between high speed and low speed printing. When your image has very exact colors, low speed is recommended.

The FULL COLOR 1, FULL COLOR 2, and GRAY SHADING options listed below are all printed at low speed for highest quality color prints. The EIGHT PRIMARY COLORS and BLACK AND WHITE ONLY options are printed at high speed.



Parameter Choices

- **FULL COLOR 1:** prints over 16 million colors using a dithering method. The printed black is arrived at by printing a composite of magenta, cyan, and yellow inks. This option is intended for printing solid color images with many colors which have only a little solid black. If FULL COLOR 1 is selected, the SELECT PRINTER COLOR ADJUSTMENT window (window 3c) may be used to adjust the colors printed.
- **FULL COLOR 2:** is just like FULL COLOR 1 except that the black color is arrived at by printing black plus one or more of magenta, cyan, and yellow ink. This option is intended for printing solid color images with many colors and a lot of black. If FULL COLOR 2 is selected, the SELECT PRINTER COLOR ADJUSTMENT window (window 3c) may be used to adjust the colors printed.
- **EIGHT PRIMARY COLORS:** prints the 8 primary colors; black, white, red, green, blue, magenta, cyan, yellow. Use this selection when printing a line drawing, or when printing saturated overheads, because the pure colors of this option will print as a solid line. Dithered colors may result in broken lines.
- **GRAY SHADING:** prints color or monochrome images in dithered black, providing 256 shades of gray ranging from saturated white to saturated black.
- **BLACK AND WHITE ONLY:** prints color or monochrome images in only saturated black and saturated white.

Figure B-7. 3a SELECT COLOR PALETTE Window.



6467-178

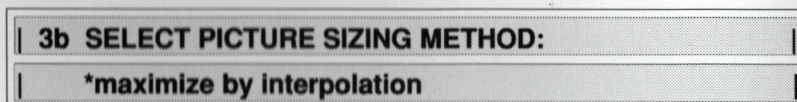
3B SELECT PICTURE SIZING METHOD

This window is a nested window only accessed when the "user defined imaging options" option is selected on the SELECT GRAPHICS APPLICATIONS MODE window (window 3). This option controls how the image will be sized when it is printed (refer to Figure B-9).

Parameter Choices

- **DO NOT ENLARGE:** The image is printed with exactly the same number of pixels as there were on the screen, in a 1 for 1 pixel ratio. This selection's image will not fill the page; rather it may be very small, depending on the terminal screen size.
- **INCREASE BY REPLICATION:** This option increases the size of the printed picture by the largest whole number possible. The enlarged printed picture is proportionally true to the original image. This method of sizing does not always fill the page. This option should be used for lines drawings because it produces lines of the same width, whereas interpolation produces lines which vary in width.
- **MAXIMIZE BY INTERPOLATION:** This option prints the image as large as possible on the page. Interpolation may distort the proportions of the printed pictures. Interpolation should not be used for line drawings because it can produce lines which vary in width.

Figure B-8. 3b SELECT PICTURE SIZING METHOD Window.



6467-179

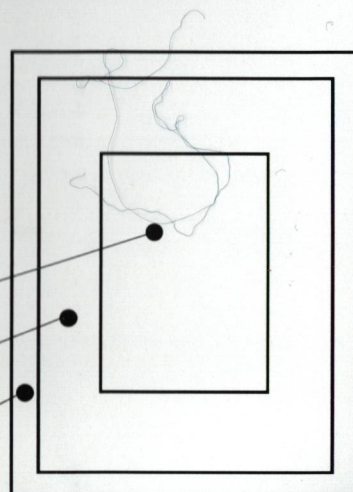
Figure B-9. Example Relative Sizes of Image Sizing Options.

**RELATIVE SIZES OF
PRINTED IMAGES SENT FROM A
1280 x 1024 PIXEL SIZE
IMAGE SOURCE**

DO NOT ENLARGE

**INCREASE
BY REPLICATION**

**MAXIMIZE
BY INTERPOLATION**



6467-180

3C SELECT PRINTER COLOR ADJUSTMENT

This window is a nested window accessed when the “user defined imaging options” option is selected on the SELECT GRAPHICS APPLICATIONS MODE window (window 3). Use this window only if “full color” or “gray shading” were selected in the SELECT COLOR PALETTE window (window 3a).

The SELECT PRINTER COLOR ADJUSTMENT option adjusts the colors printed, and has a combined total effect with the settings on SELECT VIDEO COLOR CORRECTION window (window 3d).

Parameter Choices

- DO NOT ADJUST: does no color adjust.
- PERFORM PRINTER GAMMA CORRECTION: selects correction for printer gamma error.
- PERFORM TERMINAL COLOR MATCHING: attempts to match the printed colors to colors displayed on the terminal screen.

Figure B-10. 3c SELECT PRINTER COLOR ADJUSTMENT Window.

3c SELECT PRINTER COLOR ADJUSTMENT :
*do not adjust

6467-181

3D SELECT VIDEO COLOR CORRECTION

This window is a nested window accessed when the “user defined imaging options” option is selected on the SELECT GRAPHICS APPLICATIONS MODE window (window 3). Use this window only if “full color” or “gray shading” were selected in the SELECT COLOR PALETTE window (window 3a).

Parameter Choices

This option sets the amount of video gamma correction to perform on the copy. The setting on the SELECT VIDEO COLOR CORRECTION window has a combined effect with the setting on the SELECT PRINTER COLOR ADJUSTMENT window (window 3c) to alter the printed image.

- DO NOT ADJUST: does no color correction. We suggest that users select this option, but individual tastes may vary.
- ADJUST TO 2.2 STANDARD: removes correction for a video gamma error of 2.2.
- ADJUST TO 2.4 STANDARD: removes correction for a video gamma error of 2.4.
- ADJUST TO 2.6 STANDARD: removes correction for a video gamma error of 2.6.

Figure B-11. 3d SELECT VIDEO COLOR CORRECTION Window.

3d SELECT VIDEO COLOR CORRECTION :
*do not adjust

6467-182

4 SELECT PICTURE POSITION ON MEDIA

This option controls how the printed image is oriented on the media (refer to Figure B-13).

Parameter Choices

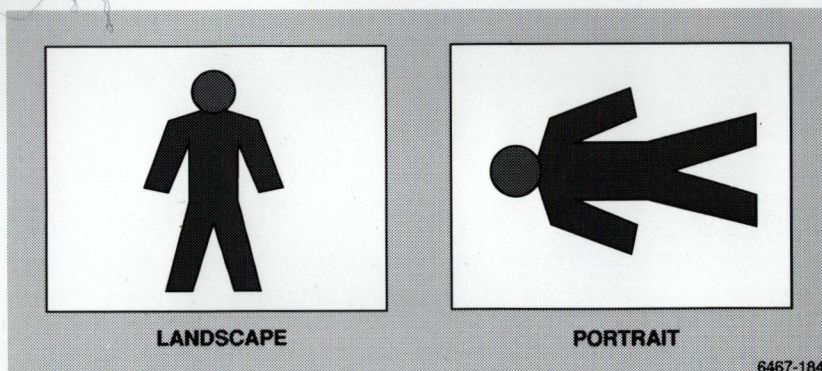
- **LANDSCAPE-CENTERED:** prints the top of the image parallel with the long axis of the media, and centered.
- **PORTRAIT-CENTERED:** prints the top of the image parallel with the short axis of the media, and centers the image in the middle of the media.
- **PORTRAIT-TOP:** prints the top of the image parallel with the short axis of the media, and places the top of the image on the top margin of the printable area.
- **PORTRAIT-BOTTOM:** prints the top of the image parallel with the short axis of the media, and places the bottom of the image on the bottom margin of the printable area.

Figure B-12. 4 SELECT PICTURE POSITION ON MEDIA Window.

4 SELECT PICTURE POSITION ON MEDIA:
*landscape-centered

6467-183

Figure B-13. Portrait and Landscape Positions on Media.



6467-184

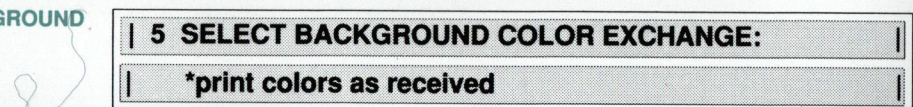
**5 SELECT BACKGROUND
COLOR EXCHANGE**

This option will switch two selected colors in an image.

Parameter Choices

- **PRINT AS RECEIVED:** prints the colors as they were received from the host, with no color exchanges.
- **EXCHANGE BLACK WITH WHITE:** inverts only fully saturated black with fully saturated white. If the background was black, it will print the background as white instead of black.
- **EXCHANGE SPECIFIC COLOR INDEXES:** switches any two colors on the color map. If this option is selected, a nested window, the **5a SPECIFY COLOR INDEXES TO EXCHANGE** window is accessed. This window is used to indicate which colors you want to exchange.

Figure B-14. 5 SELECT BACKGROUND
COLOR EXCHANGE Window.



6467-185

5A SPECIFY COLOR INDEXES TO EXCHANGE

This window is nested, and is only accessible when “exchange specific color indexes” is chosen on the SELECT BACKGROUND COLOR EXCHANGE window. Use this window to specify which colors to exchange.

Parameter Choices

- EXCHANGE XXXX COLOR WITH XXXX COLOR: Enter color indexes by scrolling numbers at each digit place to indicate the colors you want to exchange.

Figure B-15. 5a SPECIFY COLORS TO EXCHANGE Window.

5a SPECIFY COLOR INDEXES TO EXCHANGE :
EXCHANGE 0000 COLOR WITH 0000 COLOR

6467-186

6 SET INTERFACE COMPATIBILITY MODE

If you're using the 4693D with a 4100, 4200, 4110, or 4120 Series terminal, you must use the 4693D as though it were a 4692. To do so, set Window 6, INTERFACE COMPATIBILITY MODE, to "Tektronix 4692 printer".

Later versions of your terminal firmware may support the full 4693D feature set — but as of the first release of the 4693D, the only terminals that support the 4693D are the 4220 and 4230 Series terminals. If you receive a firmware update, check to see if it supports the 4693D's features. If it does, at that time you should change the INTERFACE COMPATIBILITY MODE setting to "Tektronix 4693D printer".

If you are using the 4693D with a device which uses a non-Tektronix parallel interface, such as an IBM-compatible AT type personal computer, select "parallel printer".

Refer to Appendix F, *Using the Printer with the 4510 Rasterizer*, for more details about uses of this window.

Parameter Choices

- **TEKTRONIX 4693D PRINTER:** causes the 4693D to report back its full addressability, which is dependent on the paper size being used.
- **TEKTRONIX 4692 PRINTER:** causes the 4693D to report back an addressability identical to the 4692 Color Graphics Printer, which is 1536 x 1152.
- **PARALLEL PRINTER:** changes the Tektronix parallel interface signal definitions to match that of non-Tektronix parallel interface signals (such as those from an IBM-compatible AT type personal computer).

Figure B-16. 6 SET INTERFACE
COMPATIBILITY MODE Window.

6 SET INTERFACE COMPATIBILITY MODE :
*Tektronix 4693D printer

6467-187

7 SET TERMINAL ABORT MEANING

This ensures compatibility between the 4693D and Tektronix terminals which do not have 4693D drivers or compatibility updates.

Parameter Choices

- **ABORT PICTURE PRINTING:** Select this setting if the terminal sending source images has a 4693D driver, such as the 4220 or 4230 Series Terminals. When this setting is selected and the terminal sends an ABORT command, the 4693D will stop immediately and discard whatever is in process. The printer will not print anything.
- **PRINT PARTIAL PICTURES:** Select this setting if the terminal sending source images is a pre-4220 Series and 4230 Series Terminals (which do not have 4693D drivers). When this choice is selected and an ABORT is sent from one of these terminals, the 4693D will stop receiving picture data, and will print out what was transmitted so far. (The ABORT command is treated as an EOT and ABORT command.)

Figure B-17. 7 TERMINAL ABORT
COMMAND Window.

7 SET TERMINAL ABORT MEANING :
*abort picture printing

6467-188

8 SPECIFY TERMINAL PIXEL ASPECT RATIO

Enter the terminal's pixel ratio on this window. The printer uses this information to compensate for differences between the screen's pixel shape and the printer's pixel shape so that the image can be copied in the correct proportions.

Parameter Choices

- PIXELS ARE 32 HIGH BY XX WIDE: Users scroll numbers in each digit place to enter two digits, 01 to a maximum allowed value of 64. The entered figure represents the width of the pixel as part of a pixel height/width ratio, with 32 given as the pixel height. (See Figure B-19.) That is, for a 2 to 1 ratio (height to width), users enter 16, since 16 is half of 32. To determine the pixel width for a terminal screen, follow this formula:

$$\text{pixel width} = \frac{\text{VSA} \times \text{HSM}}{\text{HSA} \times \text{VSM}} \times 32$$

Where:

VSA = Vertical Screen Addressability

HSA = Horizontal Screen Addressability

HSM = Horizontal Screen Measurement

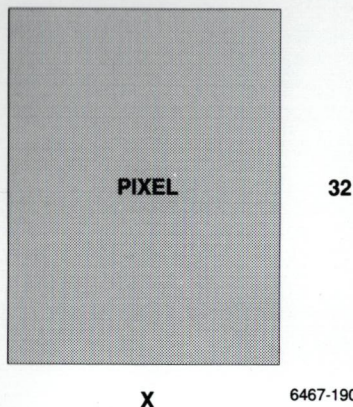
VSM = Vertical Screen Measurement

Figure B-18. 8 SPECIFY TERMINAL PIXEL ASPECT RATIO Window.

8 SPECIFY TERMINAL PIXEL ASPECT RATIO :
PIXELS ARE 32 HIGH BY 32 WIDE

6467-189

Figure B-19. Pixel Height-Width Ratio.



6467-190

9 SELECT PAPER SYSTEM

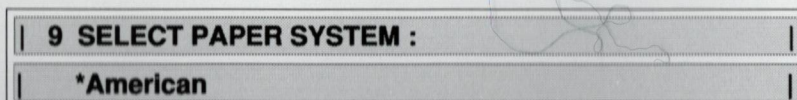
This window sets the printer default to either Metric or American paper sizes. This window works with the SELECT MEDIA TYPE window (window 2) to set the printer for sizing and printing images.

Parameter Choices

- **AMERICAN:** If this choice is selected, the printer prints on American legal or letter sized media. The length of media is set on the SELECT MEDIA TYPE window.
- **METRIC:** If this choice is selected, the printer will prints on A4 or A4 Special sized media. The length of media is set on the SELECT MEDIA TYPE window.

NOTE *If AMERICAN is selected, use the standard American-width paper cassette on the printer. If METRIC is selected, use the Metric-width paper cassette.*

Figure B-20. 9 SELECT PAPER SYSTEM Window.



The screenshot shows a window titled "9 SELECT PAPER SYSTEM :". Below the title bar, there is a list box containing the option "*American", which is highlighted, indicating it is the selected choice.

6467-122

10 DISPLAY CONFIGURATION

This window shows the configuration status of the printer, and the information shown changes only when the software is updated, or the installed memory option changes.

- V01.00-00: This shows the version number for the printer software. This will progress with each software update.
- XX MEGABYTES: This displays the amount of memory (either 4, 8 or 12 megabytes) which are installed in the printer.
- X PORTS: This displays the number of ports (either 1 or 4) installed in the printer.

Parameter Choices

This is an information window only. No choices may be entered.

Figure B-21. 10 DISPLAY PRINTER CONFIGURATION Window.

10 DISPLAY PRINTER CONFIGURATION :
V01. 00-00 , 12 mega-bytes , 4 ports

6467-191

11 PRINT TEST PICTURE

This selects and initiates a test picture. Occasionally the message "printer queue is momentarily busy" is displayed for a few seconds when users request a test picture, until the request can be queued up at the printer. Users do not need to resubmit the request if this message appears.

Parameter Choices

- **SATURATION DITHER:** Selects a grey shaded dither on each of the eight primary colors. This pattern may be used to estimate printer gamma error, so that it can be corrected at the host or terminal if desired.
- **RAG PATCH:** Selects the Rag Patch test pattern.
- **ALIGNMENT PATTERN:** Selects a pattern used to detect printer registration errors.

Figure B-22. 11 PRINT TEST PICTURE Window.

11 PRINT TEST PICTURE :
*saturation dither

6467-169

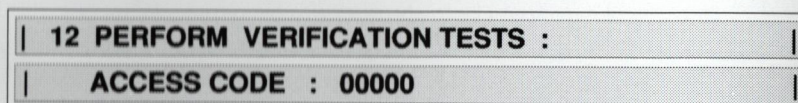
12 PERFORM VERIFICATION TESTS

This initiates an extended self test. This option will not work unless users have a valid access code. Before starting this option, make sure that the printer is not already in use. Any ports sending images to the printer will experience hard faults; all images in printer memory waiting to be printed will be lost. All images being printed will be aborted. This test locks out all users for the duration of the test.

Parameter Choices

- ACCESS CODE: Scroll each of the five digit places to the correct number to enter the valid access code of 04693.

Figure B-23. 12 PERFORM VERIFICATION TESTS Window.



The screenshot shows a window titled "12 PERFORM VERIFICATION TESTS :". Below the title bar is a field labeled "ACCESS CODE : 00000". The field has a dotted background and is flanked by vertical bars. A hand-drawn scribble is visible below the window.

6467-168

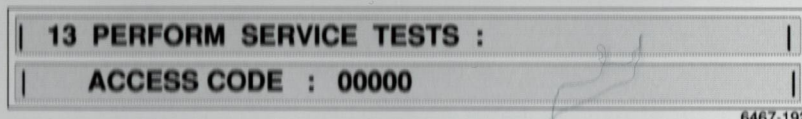
13 PERFORM SERVICE TESTS

This option initiates the factory service test, and should only be used by qualified service personnel. To use this service test, enter the valid access code. Before starting this option, make sure that the printer is not already in use. Any ports sending images to the printer will experience hard faults; all images in printer memory waiting to be printed will be lost. All images being printed will be aborted. This test locks out all users for the duration of the test.

Parameter Choices

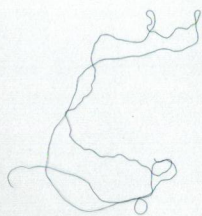
- **ACCESS CODE:** Scroll each of the five digit places to the correct number to enter the valid access code.

Figure B-24. 13 PERFORM SERVICE TESTS Window.



The screenshot shows a window titled "13 PERFORM SERVICE TESTS :". Below the title is a field labeled "ACCESS CODE : 00000". The field has a vertical line on the left and a vertical line on the right, with the text "ACCESS CODE : 00000" in the center. A hand-drawn scribble is visible over the "00000" part of the field.

6467-192



Testing and diagnostic procedures

This appendix gives information about testing and diagnostic procedures for the printer. If you find terms which are unfamiliar to you, refer to Appendix J, *Glossary of Terms*, for definitions.

There are four tests which can be performed on the printer: test pictures, verification test, power-up test, and the extended service test.

Test Pictures

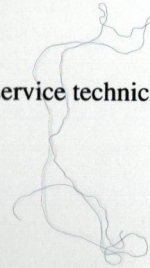
You can initiate test pictures and select the desired test pattern to print by using the front panel windows. (See Appendix B, *Front Panel Windows*, for information about using the PRINT TEST PICTURE window.)

Power Up Self Tests

The power up self tests are a subset of the tests available in the service self tests plus several duplicate tests. The power up self tests take under 10 seconds to complete, and require no operator intervention or any consumables.

These tests run when:

- Powering up the 4693D
- Pressing the printer's RESET button
- After eight hours of idle time
- As part of service self tests (by a qualified service technician)



Verification Self Tests

Verification self tests are part of the service self tests. They do not require operator intervention or any consumables. These tests take several minutes to complete, depending on optional memory installed.

The verification self tests can be started either by using the **PERFORM VERIFICATION TEST** front panel window or by using the service menu. You must enter the valid access security code to start these tests from the front panel window. It is a good idea to run a verification self test after you unpack your printer for the first time. The access code is 04693. (Refer to Appendix B, *Front Panel Windows* for information about the **PERFORM VERIFICATION TESTS** window.)

NOTE *Do not run the verification test if the printer is in the process of printing an image. This test destroys all images printing or waiting to be printed, and they will need to be sent to the printer again.*

Service Self Tests

The service self tests are accessed through the EXTENDED SERVICE TEST window, and require a valid access security code. They should only be started by qualified service personnel as described in the *4693 Series Color Printer Field Service Manual*.

Service tests are a super set of all the available self tests, and include power-up, idle, verification, CPU, input-output and DRAM tests. The following table lists all the self tests which can be run on the printer and indicates to which subgrouping(s) each test belongs. The tests are listed in the order the tests are run.

Table C-1
PRINTER SELF TESTS

Name of Test	Power-up	Idle	Verif.	CPU	I-O	DRAM
Select Menu Language						
Make a Test Copy						
Show Copy Counters						
NOVRAM Storage						
Reset Since-Last-Service Count						
Loopback Port						
Checksum of Code in Ram		X				
Version of PROM #0	X	X	X	X		
Checksum of PROM #0	X	X	X	X		
Control Register Read/Write	X	X	X	X		
DUART Read/Write	X	X	X	X		
DUART Interrupt	X	X	X	X		
NOVRAM Data Paths	X	X	X	X		
NOVRAM Address Paths	X	X	X	X		
Cash Execution Time	X	X	X	X		
Std DRAM-4 DataShorts	X	X	X			X
Std DRAM-5 DataShorts	X	X	X			X
Std DRAM-6 DataShorts	X	X	X			X
Std DRAM-7 DataShorts	X	X	X			X
Std DRAM-4 Data Paths	X	X	X			X
Std DRAM-5 Data Paths	X	X	X	X		X
Std DRAM-6 Data Paths	X	X	X	X		X
Std DRAM-7 Data Paths	X	X	X	X		X
Std DRAM-4 Adrs Paths	X	X	X	X		X
Std DRAM-5 Adrs Paths	X	X	X	X		X
Std DRAM-6 Adrs Paths	X	X	X	X		X
Std DRAM-7 Adrs Paths	X	X	X	X		X
Std DRAM-4 Execute	X	X				X
Std DRAM-5 Execute			X			X
Std DRAM-6 Execute			X			X
Std DRAM-7 Execute			X			X
Std DRAM-4 Refresh			X			X
Time Out Bus Error	X	X	X	X		

Table C-1 (cont.)
PRINTER SELF TESTS

Name of Test	Power-up	Idle	Verif.	CPU	I-O	DRAM
T-Wax Reg 0 Read/ Write	X	X	X		X	
T-Wax PRDY	X	X	X		X	
T-Wax ONL	X	X	X		X	
T-Wax Byte FIFO	X	X	X		X	
T-Wax Nibble FIFO	X	X	X		X	
T-Wax Interrupt	X	X	X		X	
T-Wax HSYNC Time	X	X	X		X	
PIF Reg 0 Read/Write	X	X	X		X	
PIF Reg 1 Read/Write			X		X	
PIF Memory Data Paths	X	X	X		X	
PIF Memory Change Halves	X	X	X		X	
PIF Memory Adrs Paths	X	X	X		X	
PIF Byte Counter	X	X	X		X	
PIF Tek Encoded Data	X	X	X		X	
PIF Interrupt	X	X	X		X	
Port 1 DTSB	X	X	X		X	
Port 2 DTSB	X	X	X		X	
Port 3 DTSB	X	X	X		X	
Port 4 DTSB	X	X	X		X	
PIF Time Out			X		X	
Op34 DRAM-8 DataShrts	X	X	X			X
Op34 DRAM-9 DataShrts	X	X	X			X
Op34 DRAM-A DataShrts	X	X	X			X
Op34 DRAM-B DataShrts	X	X	X			X
Op34 DRAM-8 Data Pths	X	X	X			X
Op34 DRAM-9 Data Pths	X	X	X			X
Op34 DRAM-A Data Pths	X	X	X			X
Op34 DRAM-B Data Pths	X	X	X			X
Op34 DRAM-8 Adrs Pths	X	X	X			X
Op34 DRAM-9 Adrs Pths	X	X	X			X
Op34 DRAM-A Adrs Pths	X	X	X			X
Op34 DRAM-B Adrs Pths	X	X	X			X
Op34 DRAM-8 Execute			X			X
Op34 DRAM-9 Execute			X			X
Op34 DRAM-A Execute			X			X
Op34 DRAM-B Execute			X			X
Op34 DRAM-8 Refresh			X			X
Op38 DRAM-C DataShrts	X	X	X			X
Op38 DRAM-D DataShrts	X	X	X			X
Op38 DRAM-E DataShrts	X	X	X			X
Op38 DRAM-F DataShrts	X	X	X			X
Op38 DRAM-C Data Pths	X	X	X			X
Op38 DRAM-D Data Pths	X	X	X			X
Op38 DRAM-E Data Pths	X	X	X			X
Op38 DRAM-F Data Pths	X	X	X			X
Op38 DRAM-C Adrs Pths	X	X	X			X
Op38 DRAM-D Adrs Pths	X	X	X			X
Op38 DRAM-E Adrs Pths	X	X	X			X
Op38 DRAM-F Adrs Pths	X	X	X			X

Table C-1 (cont)
PRINTER SELF TESTS

Name of Test	Power-up	Idle	Verif.	CPU	I-O	DRAM
Op38 DRAM-C Execute			X			X
Op38 DRAM-D Execute			X			X
Op38 DRAM-E Execute			X			X
Op38 DRAM-F Execute			X			X
Op38 DRAM-C Refresh			X			X
Move into DRAM	X	X	X			

Messages

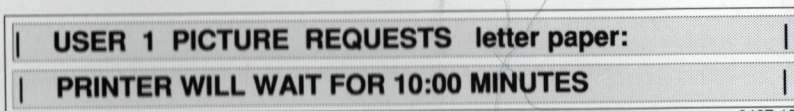
This appendix covers information about the exception messages displayed on the front panel window of the printer. Refer to Appendix J, *Glossary of Terms*, for definitions of unfamiliar terms.

USER MEDIA REQUEST

If the preceding job used different media from this job, the printer stops operating, and a USER MEDIA REQUEST message appears on the front panel prompting the user to load the correct type of media (letter paper, legal paper, or transparencies).

The USER MEDIA REQUEST window will display (and count down the time) for 10 minutes, waiting for the user to change the media. After 10 minutes, the printer will print the job on whatever media is loaded even if it is not the specified media.

Figure D-1. USER MEDIA REQUEST Window.



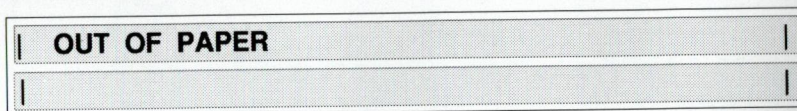
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OUT OF PAPER

This window displays when the paper cassette is empty, or when the paper cassette is not properly installed.

The printer only prints after the cassette is refilled. If the power is left on, the printer keeps the images in queue. When the media is loaded, images continue to print. Follow instructions in Section 4, *Maintenance and Troubleshooting*, to load copy media.

Figure D-2. OUT OF PAPER Window.

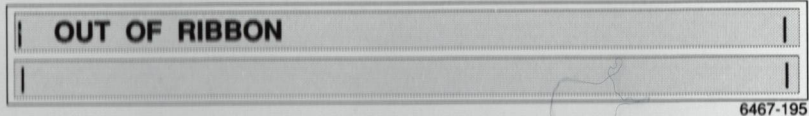


6467-194

OUT OF RIBBON

This window displays when the loaded transfer roll is exhausted. The printer will not print until the thermal transfer roll is replaced. If the power is left on, all the images in queue will continue to be printed when the transfer roll is replaced. Follow instructions in Section 4, *Maintenance and Troubleshooting*, to replace the thermal transfer roll.

Figure D-3. OUT OF RIBBON Window.

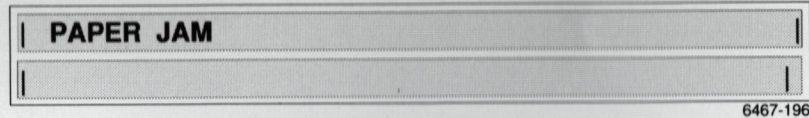


MEDIA JAM

This window indicates that media is jammed in the printer either because the media was not loaded correctly, or the media is faulty. The printer will not print until the jammed media is cleared. If it is possible to clear the jam without shutting the power down, all pictures sent to the printer and waiting to be printed will remain in printer memory and print when the jam is cleared.

If you power down the printer, or open the upper half in order to clear the jammed media, the images already sent to the printer but not yet printed are lost from printer memory, and must be resubmitted for printing. Follow instructions in Section 4, *Maintenance and Troubleshooting*, to remove misfeeds.

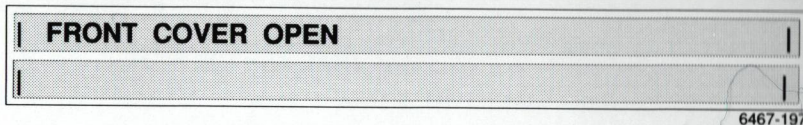
Figure D-4. PAPER JAM Window.



FRONT COVER OPEN

This window indicates that the printer's front cover is open, and the printer will not print until this cover is closed. If the power is left on, all pending images will remain in the printer's memory and print when the cover is closed.

Figure D-5. FRONT COVER OPEN Window.



PRINTER FAILURE

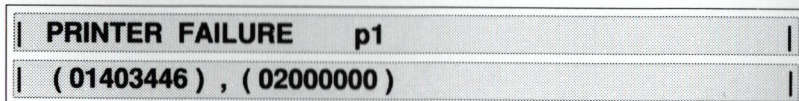
This window displays when the printer or interface has failed. When these errors occur, the printer will shut down operation until some service is performed. With some errors, powering the printer down for a short time may be sufficient to clear the error.

A two character error code will be displayed indicating a particular error. In addition, some errors will also print a second line containing two eight digit fields. The first field is the program counter of the software experiencing the failure, and the second field contains the internal processor address for the error.

The error codes and their meanings are as follows:

- P2 - The print head has overheated and the printer will temporarily stop printing. Do not interrupt the print job; wait for the printer to continue. No service is needed unless this message appears frequently.
- Any other message - Turn the printer off and then back on first. If the message continues to display, the printer should be repaired by a qualified service technician.

Figure D-6. PRINTER FAILURE Window.



Terminal hardcopy commands

The 4693D features can be controlled from the printer itself, from the terminal to which it is connected, or from both. When a feature can be controlled by both the printer and the terminal, the terminal setting will override the printer setting. Tables E-1, E-2, and E-3 show how the terminal hardcopy commands and the printer options interact:

- Table E-1 lists the printer options that have corresponding terminal commands.
- Table E-2 lists all the terminal commands that can be used to control the 4693D.
- Table E-3 lists the terminal commands that, aside from the COPY keys on your terminal keyboard, can be used to generate copies.

Refer to your terminal documentation for information about these commands and how to issue them.

NOTE *If you're using the 4693D with a 4100, 4200, 4110, or 4120 Series Terminal, you must use the 4693D as though it were a 4692. Later versions of terminal firmware may support the full 4693D feature set — but as of the first release of the 4693D, the only terminals that support the 4693D are the 4220 and 4230 Series Terminals.*

These tables are broken up by family:

- 4100 means the 4100 Series Terminals, which include the 4105, 4106, 4107, 4109 terminals and their CX versions.
- 4200 means the 4200 Series Terminals, which include the 4205, 4207, 4208, and 4209 terminals and their CX versions.
- 4110 means the 4110 Series Terminals, which include the 4111, 4113, 4115.
- 4120 means the 4120 Series Terminals, which include the 4125, 4126, 4128, 4129.
- 4220 means the 4220 Series Terminals.
- 4230 means the 4230 Series Terminals.

Table E-1
PRINTER OPTIONS THAT HAVE A CORRESPONDING TERMINAL COMMAND

Printer Option	Function	Terminal Commands That Affect This Setting (see Table 2)
3a SELECT COLOR PALETTE	Controls how the color in your image will be printed	SET COLOR COPY DATA RESOLUTION and SET COLOR HARDCOPY DITHERING
3c SELECT PRINTER COLOR ADJUSTMENT	Adjusts how the color is printed	SET COLOR COPY DATA RESOLUTION and SET COLOR HARDCOPY DITHERING
4 SELECT PICTURE POSITION ON MEDIA	Specifies whether copies will be printed in landscape or portrait format	SET IMAGE ORIENTATION and SET COPY SIZE
5 SELECT BACKGROUND COLOR EXCHANGE	Switches two colors or saturated black and white	SCopy key or HARDCOPY with a parameter 0, 1, or 3 (host only)

Table E-2
TERMINAL COMMANDS THAT AFFECT THE 4693D

Command Name	Setup Name ^a	4100	4200	4110 & 4120	4200 & 4230
SET HARDCOPY DATA RESOLUTION	HCDATARES	Yes	Yes	Yes	No
SET IMAGE ORIENTATION	HCORIENT	Yes	Yes	Yes	Yes
SET COLOR HARDCOPY DITHERING	HCDITHER	No	No	Yes	Yes
SET NUMBER OF COPIES	HCCOPIES	Yes	Yes	Yes	yes
SET HARDCOPY FEATURES	HCFEATURES	No ^b	Yes	No	Yes
SET DIALOG HARDCOPY ATTRIBUTES	HCDAATTRIBUTES	Yes	Yes	No	Yes
SET COPY SIZE	HCSIZE	Yes	Yes	No	No

^a Not all terminals use Setup names.

^b SET HARDCOPY FEATURES was introduced in 4107 Firmware Version 10.

Table E-3
TERMINAL COMMANDS THAT GENERATE COPIES

Command Name	Setup Name ^a	4100	4200	4110 & 4120	4220 & 4230
HARDCOPY	(None)	Yes	Yes	Yes	Yes
COPY	COPY	Yes	Yes	Yes	No
SPOOL	SPOOL	No	No	Yes	No
4010HARDCOPY	(None)	Yes	Yes	Yes	Yes

^a Not all terminals use Setup names.



Using the printer with a 4510A Rasterizer



The 4693D Color Image Printer can be connected to any of the Tektronix 4510, 4510A, or CX4510A Rasterizers. Newer models of the Tektronix 4510A and CX4510A Rasterizers have been enhanced to take advantage of the 4693D's high resolution and fast throughput, particularly when making multiple prints of an image. 4510, 4510A, and CX4510A having version 5.0 firmware or greater can be directly connected with no upgrade necessary.

Older 4510A rasterizers (with firmware version 5.0 or less) can be upgraded to take advantage of the 4693D. As an alternative, these rasterizers can also be directly connected, with no upgrade, if users set the front panel 6 SET INTERFACE COMPATIBILITY MODE window to "Tektronix 4692 printer" selection. Contact your local Tektronix office to arrange an upgrade. The firmware version number appears on the label at the back of the rasterizer.

The 4693D connects to the back of the 4510 series rasterizer with the printer's standard interconnect cable. You do not need to change any of the settings on the rasterizer's back panel.

To connect the rasterizer to the printer, set the DIP switches on the 4693D to OFF for 4510A and CX4510A rasterizers. Set the DIP switches on the 4693D to OFF for 4510A and CX4510A rasterizers. Set the DIP switches on the printer to ON if connecting a 4510 rasterizer. (Refer to Appendix A *Installation Procedures* for more information.)

Setting the Front Panel

Two settings on the 4693D front panel need to be adjusted when using the printer with the 4510 rasterizer: the 3 GRAPHICS APPLICATION MODE window, and the 6 SET INTERFACE COMPATIBILITY MODE window.

There are two possible combinations of settings on the 3 GRAPHICS APPLICATION MODE window and the 6 SET INTERFACE COMPATIBILITY MODE window.

If the 3 GRAPHICS APPLICATION MODE window is set to "Tektronix 4510 special graphics mode" the 6 SET INTERFACE COMPATIBILITY MODE window must be set to "Tektronix 4693D printer". With this setting, the 4510 does the imaging, and provides the best results. This means that the printer is limited to the 4510 color or monochrome printing shades (refer to Figure F-1).

Figure F-1. Setting Window 3 and 6 for 4510A Imaging.

PREFERRED SETTINGS

3	SELECT GRAPHICS APPLICATION MODE :	
	*Tektronix 4510 special graphics mode	

Select this setting on Window 3.

6	SET INTERFACE COMPATIBILITY MODE :	
	*Tektronix 4693D printer	

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If the 3 GRAPHICS APPLICATION MODE window is set to any of the application-oriented settings (such as "color pie charts, bar graphs," "color schematics," and the like) *with the exception of "Tektronix 4510 special graphics mode"* the 6 SET INTERFACE COMPATIBILITY MODE window should be set to "Tektronix 4692 printer". With this setting, both the 4510A and the printer process the imaging. Use this setting with caution, since the imaging process can distort the dithering colors (refer to Figure F-2).

Figure F-2. Setting Window 3 and 6 for both 4510A and Printer Imaging.

3 SELECT GRAPHICS APPLICATION MODE :
color line drawings / text

Select any setting except "Tektronix 4510 special graphics mode" on Window 3.

6 SET INTERFACE COMPATIBILITY MODE :
*Tektronix 4692 printer

Select this setting on Window 6.

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Throughput

When the 4693D Color Image Printer is connected to the Tektronix 4510A rasterizer the printing process is as follows:

1. Graphic data is sent to the rasterizer.
2. The rasterizer rasterizes the data, converting lines and panels to pixels for the 4693D. The entire picture must be sent to the 4693D before printing begins.
3. The printer performs additional image processing on the image (if the SELECT GRAPHICS APPLICATION MODE window was not set to the 4510 mode).
4. The 4693D begins to print the picture.

The combination of the 4693D Color Image Printer with the Tektronix 4510A rasterizer queues images in several ways, and the steps above may occur concurrently when several images are sent in a row. The way the steps actually take place depends on the nature of the images, and the amount of memory available in the printer.

For instance, if the 4693D has more than 4 megabytes of memory, steps 2, 3, and 4 can occur at the same time. This noticeably cuts down on throughput time when more than one image is being printed. If the 4510A input queue size is set to be large enough to contain an entire picture, then steps 1 and 2 can occur simultaneously, also cutting throughput time. Shorter throughput times can be advantageous in offsetting slower data communications.

Specifications

This appendix contains the specifications for the printer. For definitions of unfamiliar terms, refer to Appendix J, *Glossary of Terms*.

Performance Conditions

The printer's performance limits require that you locate the printer in an environment that conforms to the limits described in this section.

Table G-1
FUNCTIONAL SPECIFICATION

Performance Requirement	Supplemental Information
Warm Up Time 1 Minute	
Interface Type (Input)	Tek Parallel Interface (TPI) (Tektronix Document Number 15-005-01).
Printed area <ul style="list-style-type: none"> • 8.13" x 8.31" • 8.13" x 10.66" • 200mm x 229mm • 200mm x 271mm 	<ul style="list-style-type: none"> • A size (8 1/2" x 11"). • legal size (8 1/2" x 14"). • A4 size (210mm x 297mm). • A4 special size (210mm x 356mm).
Print Time 43-98 seconds	Times depend on the paper size, speed, and if black is printed as composite (cyan, magenta, and yellow) or black ink.
Image transfer time less than 2.5 seconds	Time depends on the transfer rate of the image source.
Image processing time 0-63 seconds	Time depends on paper size, color index used, video gamma correction.
Support for 4104, 4105, 4107, 4109, 4205, 4207, 4208, and 4209	Use 4692 emulation mode and background spooling in the terminal.
Support for 4111 input	Use 4692 emulation mode. Terminal tie-up time reduced to 80 seconds.
Support for 4113, 4115, 4125, 4126, 4128, 4129 input	Use 4692 emulation mode. Terminal tie-up time not reduced.
Support for 4510A input	
Support for SUN/IKON input	Terminal tie-up time not reduced.
Support for Apollo/IKON input	Use 4692 emulation mode. Terminal tie-up time not reduced.
Support for IBM PC/AT Parallel Adapter input.	Using a file containing TPI data "Copy /B file.ext LPT1:"
Power-Up Sequence	10 seconds of self test then ready to receive a picture.

Table G-1 (cont.)
FUNCTIONAL SPECIFICATION

Performance Requirement	Supplemental Information
<p>Memory required for input</p> <ul style="list-style-type: none"> • 0.5 bytes/pixel (+ line fill) • $\text{long} \times (\text{short} + 1) \times \text{BPP} + 1220 \times (\text{IV} + 1) + \text{MAP}$ 	<p>(Select one of two formulas depending on transmission mode). For the 4510 Special Graphic Mode. (Each line is filled to an even 4 byte boundary). LONG is the count of pixels in the long axis of the transmitted picture. SHORT, count in short axis. BPP = 3 and MAP = 0 for:</p> <ul style="list-style-type: none"> • Tektronix 8-bits/primary • arbitrary 8-bits/primary <p>BPP = 2 and MAP = 16,384 for:</p> <ul style="list-style-type: none"> • Tektronix 4-bit/primary • arbitrary 4-bit/primary • index 12-bit/index <p>BPP = 1 and MAP = 16,384 for:</p> <ul style="list-style-type: none"> • Tektronix 2-bit/primary • Tektronix 1-bit/primary • arbitrary 2-bit/primary • index 8-bit/index <p>IV is the interpolation value (IV = 1 if same number of pixels in print as in transmitted image).</p> <ul style="list-style-type: none"> • 4230 with up to 12 bit planes is 2.643 megabytes. • 4230 with up to 24 bit planes is 3.940 megabytes. • 4220 is 0.806 megabytes. • 4105 and 4205 is 0.192 megabytes. • 4107, 4109, 4207, 4208, 4209 is 0.327 megabytes. • 4510 Series with 4693D (not using 4510 mode and using 4692 size) 3.562 megabytes.^b • 4510 Series using 4693D (not using 4510 mode) 11.211 megabytes.^b • 4510 Series with 4693D (using 4510 mode) is 2.800 megabytes.^b • 4510 Series with 4693D (using 4510 mode and using 4692 size) is 0.886 megabytes.^b • SUN color workstation is 3.114 megabytes. • Apollo color workstation is 3.153 megabytes.
<p>Memory available for Picture</p> <ul style="list-style-type: none"> • 3.940 megabytes • 8.133 megabytes • 12.327 megabytes 	<p>Standard Memory. Option 34 Memory. Option 38 Memory.</p>
<p>Memory required for printing</p> <ul style="list-style-type: none"> • 3.070 megabytes • 3.931 megabytes • 3.225 megabytes • 3.815 megabytes 	<p>Paper size (dot \times line).^a</p> <ul style="list-style-type: none"> • A size (2440 \times 2492). • Legal size (2440 \times 3198). • A4 size (2368 \times 2700). • A4 special size (2368 \times 3198).

^a The memory used for a pixel is the greater of one of these: either the memory required for printing or the memory required for input.

^b Assumes the 4510 is using the default 3:4 aspect ratio. More information about using the 4510 Series Rasterizers with the printer is in Appendix F, Using the Printer with a 4510A Rasterizer.

Table G-2
ELECTRICAL SPECIFICATION

Performance Requirement	Supplemental Information
Primary Voltage Ranges	87 - 128 VAC (110 VAC nominal) 174 - 250 VAC (220 VAC nominal)
Frequency Range	48 to 62 Hz
Primary Fusing Voltages	@ 110 VAC 5 amps @ 220 VAC 5 amps
Maximum Power Dissipation	235 watts

Table G-3
INSTALLATION REQUIREMENTS

Performance Requirement	Supplemental Information
Heat generated 800 BTU per hour (maximum)	
Surge current <ul style="list-style-type: none"> • 30 amps at 120 VAC. • 50 amps at 220 VAC. 	
Flatness of the mounting surface <ul style="list-style-type: none"> • Within 5 degrees of horizontal, and with all four feet in contact with the surface. 	
Minimum space for cooling and access <ul style="list-style-type: none"> • 24 inches high. • 33.75 inches wide. • 38.75 inches deep. 	Breakdown of space requirements for cooling and access <ul style="list-style-type: none"> • 4 inches all sizes for cooling. • Area between the printer and its mounting surface must be clear of obstruction to allow free air flow. • 11.5 inches top clearance for drum and paper feed access with Image Processing Module raised. • 4 inches right side beyond paper cassette and tray for tray removal. • 8 inches front clearance. • 13.5 inches required for transfer roll cartridge replacement.

Table G-4
MECHANICAL SPECIFICATIONS

Performance Requirement	Supplemental Information
Cabinet Structure	Physical dimensions: without paper cassette 12.625" high, 21.840" wide, and 21.244" deep. With cassette and tray, add 13" to the width. Weight: approximately 99 lbs without paper trays.

Table G-5
ENVIRONMENTAL SPECIFICATIONS

Performance Requirement	Supplemental Information
Temperature <ul style="list-style-type: none"> • Storage • Operating • Non-Operating 	-20° to + 60°C without transfer roll. + 15° to + 30°C 0° to + 40°C (power off).
Humidity <ul style="list-style-type: none"> • Storage • Operating 	10 to 90% relative humidity (non-condensing). 20 to 80% relative humidity (non-condensing).
Altitude <ul style="list-style-type: none"> • Non-Operating • Operating 	0 to 50,000 ft pressure altitude. To .8942 kg/m minimum air density 0 to 15,000 ft @25°C.
Vibration Operating (no copy in progress)	Three mutually perpendicular axes: 0.75 g, 25 minute sweep, 5-200-5 Hz. 100-200 sec/sweep cycle. No resonant frequencies below 25 Hz.
Packaged Product <ul style="list-style-type: none"> • Vibration and Shock Vibration • Shock 	per ASTM D999-75, Method B. per ASTM D775-61.V
Electrostatic Immunity <ul style="list-style-type: none"> • Operating • Non-Operating 	No interruption of operation, loss of data, or change of operating mode after subjected to a discharge through a 1 K Ω resistance of a 500 pf capacitor charged to 15KV provided: <ul style="list-style-type: none"> • Test not applied to connector pins. No damage to device or loss of non-volatile storage when subjected to 20KV shock.
Electromagnetic Compatibility	The device complies with the following standards pertaining to electromagnetic compatibility: Verified to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC Rules. See instructions if interference to radio reception is suspected. VDE 0871/6.78, Regulation for the Radio Frequency Interface Suppression of High Frequency Apparatus and Installations. VDE 0875, Regulation for RFI Suppression of Electrical Equipment and Installations.

Table G-6
SAFETY SPECIFICATIONS

Performance Requirement	Supplemental Information
Safety standards	<p>The device complies with the following safety standards:</p> <ul style="list-style-type: none"> • UL 478, 5th edition, Information Processing and Business equipment. • CSA Standard C22.2 No. 154-1983, Data Processing Equipment. • IEC 380, Safety of Business Machines. • IEC 435, Safety of Data Processing Equipment. • German VDE, British Telecom and Australian Telecom (satisfied by compliance with IEC 380 and IEC 435).

Table G-7
INTERFACE CONNECTOR SIGNAL AND GROUND ASSIGNMENTS

Signal Name	CON-Signal	PIN-Return Ground	ASSN-Shield	Signal Source
DSTB-0	1	19	a	Host
D0	2	20	a	Host
D1	3	21	a	Host
D2	4	22	a	Host
D3	5	23	a	Host
D4	6	24	a	Host
D5	7	25	a	Host
D6	8	26	a	Host
D7	9	27	a	Host
ACK-0	10	28	a	Copier
BUSY-1	11	29	a	Copier
FAULT-0	32	29	a	Copier
IR/SO	12	—	—	Copier
SLCT	13	—	—	Copier

^a All shields tied to the cable and connector shield.

Options, accessories and supplies

Options

Input Port Options

- Option 02 - 4 Channel Multiplexer

Memory Options

- Option 34 - Additional 4 megabytes of frame buffer memory
- Option 38 - Additional 8 megabytes of frame buffer memory (This option is two Option 34 boards)

Interface Options

- Option 42 - SUN Workstation Driver (includes hardware and software)
- Option 44 - Printer Interface Kit for Macintosh II
- Option 04 - Exchange Standard Parallel Interface Cable with 25-pin PC to Printer Centronics Interface Cable

Service Manual Option

- Option B1 - Include the *4693 Series Color Printer Field Service Manual* 070-6484-00

Service Options

- Option S0 - Field instructions of product.
- Option S1 - One year of full on-site service coverage.
- Option S2 - Two years of full on-site service coverage.
- Option S3 - Three years of full on-site service coverage.

International Options

The standard configuration has a U.S. (115) power cord and A size paper. The following international options exclude the US power cord and use a different main voltage selection switch, as noted below. These can be ordered as replacement parts also.

- Option A1 - European Power Cable (220V)
- Option A2 - U.K. Power Cable (240V)
- Option A3 - Australian Power Cable (240V)
- Option A4 - N. America Power Cable (240V)
- Option A5 - Swiss Power Cable (240V)
- Option 01 - A4 Metric Starter Kit (includes A4 and A4 Special paper, A4 transparencies, and metric width paper cassette). This option replaces the Standard Start-Up Kit.

Accessories

Standard Accessories

- Power Cord, 115 volt 161-0066-00
- Printer Interconnect Cable, 3 meters 012-1233-00
- User Manual 070-6467-00
- Quick Reference Guide 062-9214-00
- Four Color Transfer Roll 016-0898-00
- Head Cleaner 006-7081-00
- Standard Start-Up Kit (Contains A and legal paper, A size transparencies and American width paper cassettes). This start-up kit comes with the Standard Power Option, and cannot be separately ordered.

Optional Accessories

- *4693D Tektronix Parallel Interface Support Software Development Guide* 070-6468-00
- Parallel Interconnect Cable, 9 meter 012-1234-00
- Parallel Interconnect Cable, 15 meter 012-1235-00
- 25-Pin PC-to-Centronics Interface Cable 012-1214-00
- Loopback Connector 067-1318-00
- Replacement Power Cord
 - Standard USA 161-0066-00
 - Option A1 - European 161-0066-09
 - Option A2 - UK 161-0066-10
 - Option A3 - Australian 161-0066-11
 - Option A4 - N. America 161-0066-12
 - Option A5 - Swiss 161-0154-00
- A size Paper Cassette (American) 436-0204-00
- A4 size Paper Cassette (Metric) 436-0205-00
- Receiving Tray 436-0203-00
- Transfer Roll Cassette 118-6805-00

Supplies

- Media
 - Paper, A size (8 1/2" x 11") (1000 sheet case) 016-0891-00
 - Paper, legal size (8 1/2" x 14") (1000 sheet case) 016-0892-00
 - Paper, A4 size (210 x 297mm) (1000 sheet case) 016-0893-00
 - Paper, A4 Special size (210 x 356mm) (1000 sheet case) 016-0894-00
 - Transparency, A size (pkg of 50 sheets) 016-0895-00
 - Transparency, A4 size (pkg of 50 sheets) 016-0896-00
- Transfer Rolls
 - Four Color Transfer Roll (one roll) 016-0898-00

Field Kits

- 4693 F34, add 4 megabytes of memory, field installable (Maximum of 12 megabytes allowed in the printer). Every printer is shipped from the factory with 4 megabytes of memory.
- 4693 F02 01 4-Channel Multiplexer F Kit, field installable. Provides the printer with four host interface inputs.
- 4693F44 Printer Interface Kit. Provides hardware and software for connecting the printer to an Apple Macintosh II computer.

Technical overview of 4693D

This appendix gives a general overview of the technical processes internal to the 4693D. For more detailed information, refer to the *4693 Series Color Printer Field Service Manual* and the *4693D Tektronix Parallel Interface Support Software Development Guide*. Refer to Appendix J, *Glossary* for definitions of unfamiliar terms.

The 4693D takes information from the host or terminal, does image processing, and prints the copy. For purposes of clarity, these three functions are described separately.

The Host/Terminal

The host or terminal sends image information to the 4693D. The host/Terminal has a driver and holds the bit map. The driver sends commands, image data, status information, parameters, and defaults. The bit map is the image being copied or printed.

Most Tektronix terminals are compatible with 4693D; most non-Tektronix terminals with 4693D drivers or 4692 drivers are also compatible.

The Printer

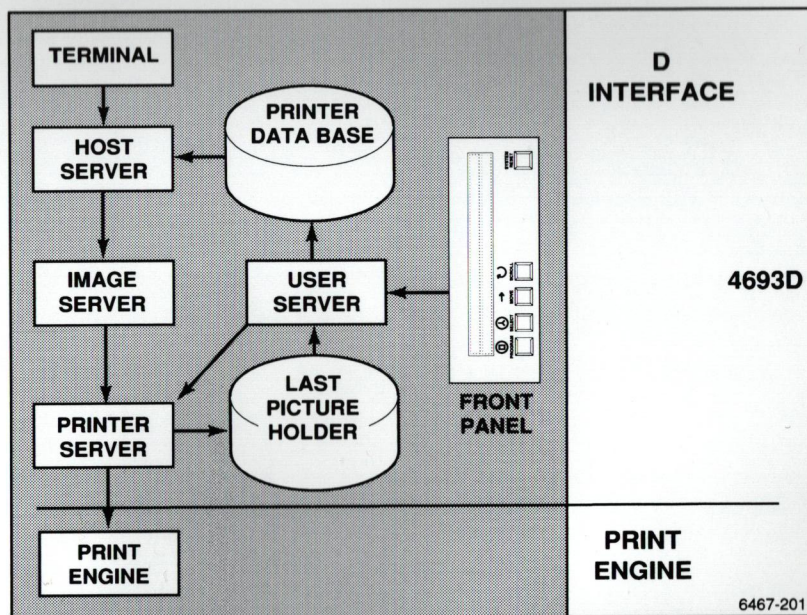
The 4693D Color Image Printer is a raster image processor (digital interface) attached to a thermal wax print engine. The interface moves image data (in the form of a bit map) from the host or terminal to the printer, and does image processing. The printer prints the image according to the instructions sent to it by the interface.

The Raster Image Processor

The image processor is made up of the following parts (refer to Figure I-1):

1. **THE HOST SERVER:** Receives image and command information from the compatible Host/Terminal driver and reformats it for the ImageServer. It also reads defaults on the Printer Data Base, and the printer status message.
2. **IMAGE SERVER:** Follows commands to manipulate the image data, and reformats image data again for the Printer Server.
3. **PRINTER SERVER:** Reformats image data to send to printer. It also saves an unformatted copy of the image data on the Last Picture Holder data base for possible reprinting.
4. **PRINTER DATA BASE:** Holds default information set on the front panel.
5. **USER SERVER:** Displays messages on the front panel display, and sends updated setup parameters to Printer Data Base. It also displays status messages about type of printer, amount of the 4693D memory, and options chosen on front panel. It also sends reprint requests to the Printer Server.
6. **IDLE PROCESS:** Keeps the 4693D warm, and after 8 hours of idling, initiates a restart.

Figure I-1. Parts of the 4693D.



The Print Engine

The Thermal printer accepts image data and copies according to the instructions sent by the Printer Server.

The thermal printer's resolution is 2516 x 2440 for A size paper; 2724 x 2368 for A4 size; 3222 x 2440 for legal size paper; and 3222 x 2368 for A4 Special size paper. The printer automatically feeds sheet paper or transparencies.

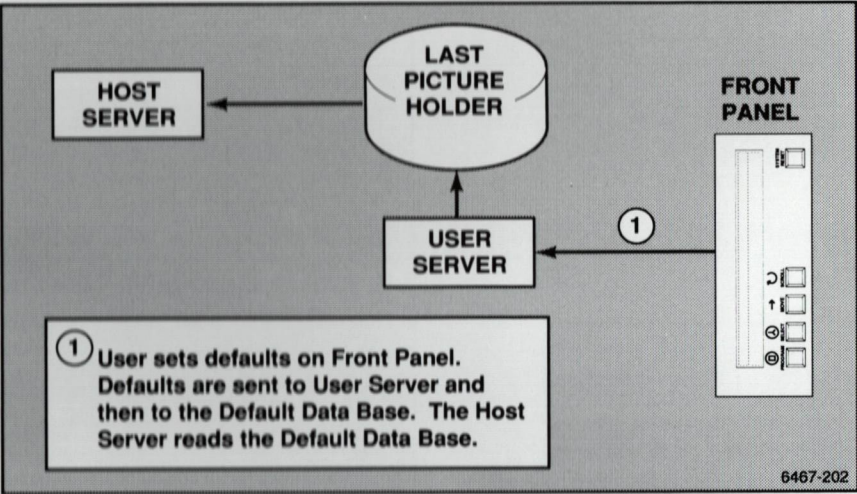
It uses a wax transfer method of printing either monochrome or color copies. Monochrome prints may have up to 256 shades of gray. Color prints may have a maximum of more than 16 million colors with black, cyan, magenta, and yellow inks. A single print takes 0-10 seconds to load, and 64 seconds per copy on A size paper.

A parallel interface cable connects the host/terminal to the 4693D in a standard option, or four parallel interface cables connect it for optional multiplexing.

Setting Parameters on the Printer

Before making prints, users can set printer parameters via the front panel keys and windows. These parameters tailor the image processing features to specific applications and needs. (See Figure I-2)

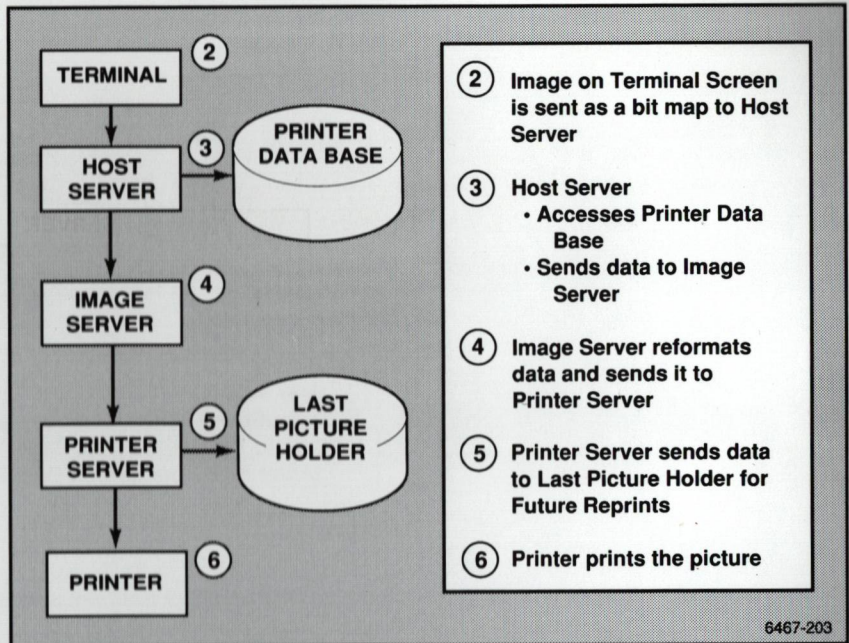
Figure I-2. Setting Defaults.



Making a Print

Once the printer's defaults have been set, users can make a print, as shown in Figure I-3.

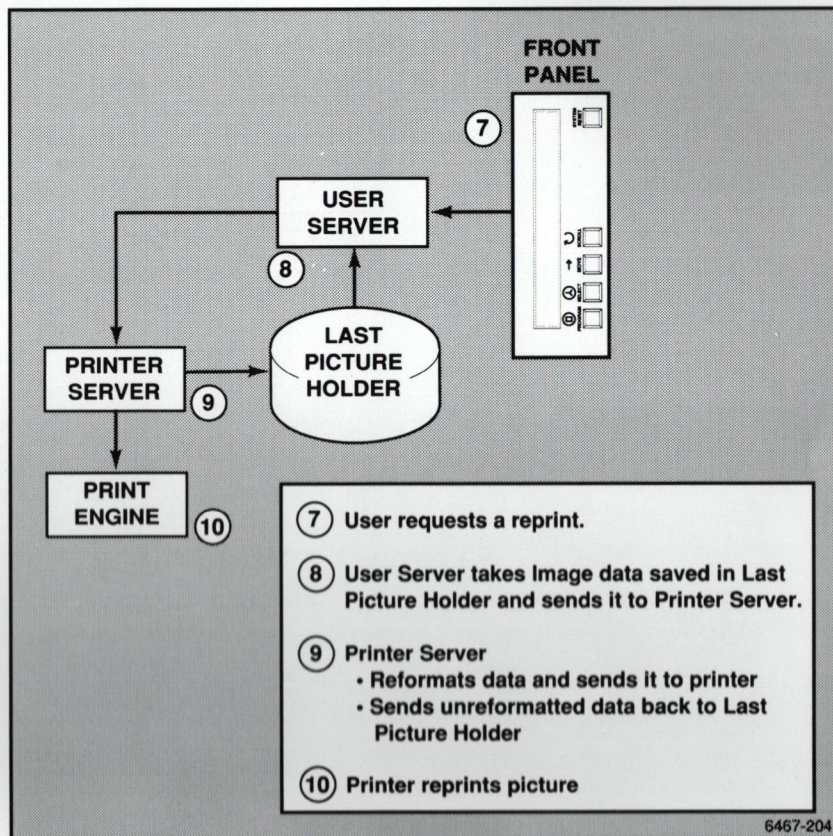
Figure I-3. Making a Print.

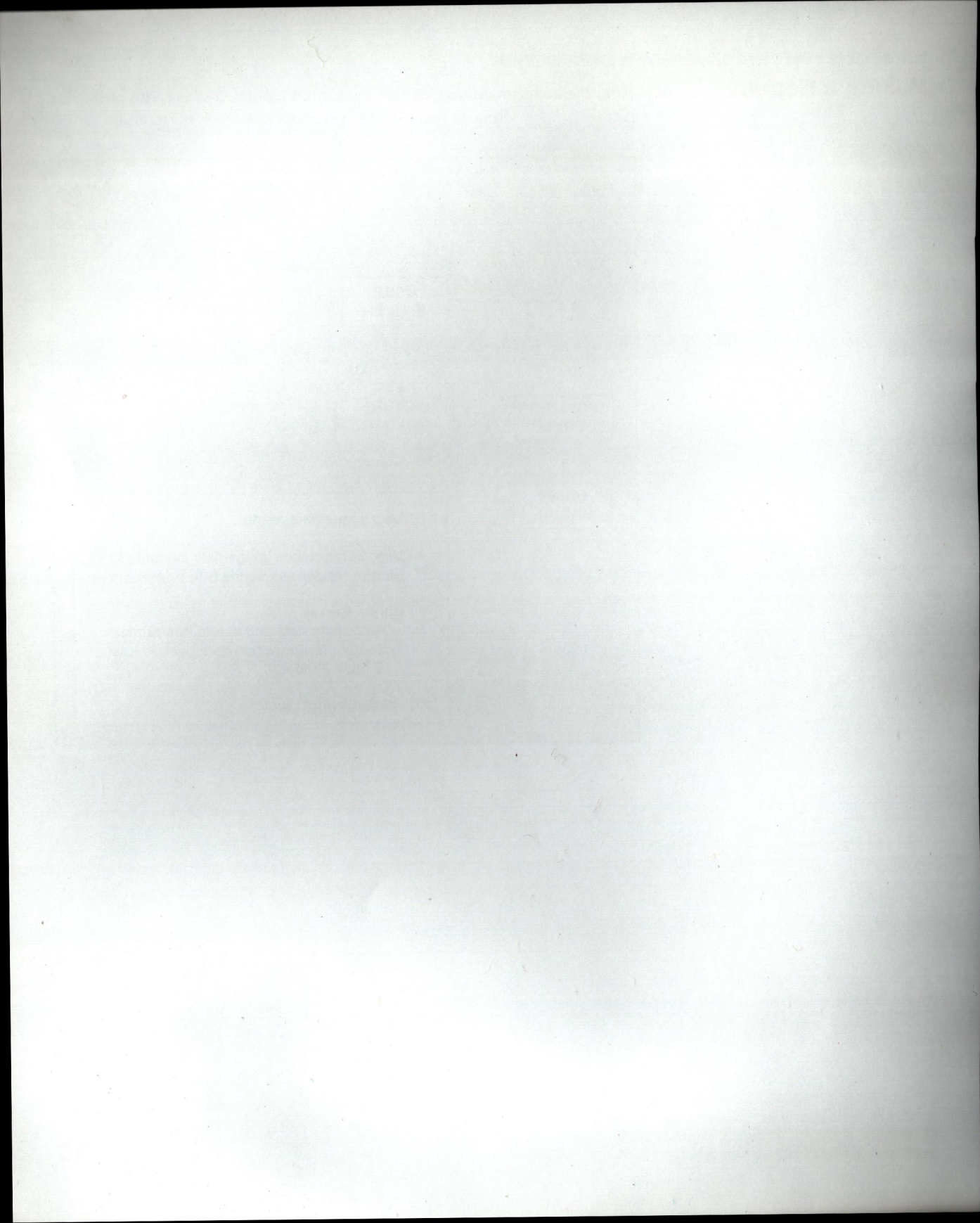


Making a Reprint

After the image is printed the first time, users can request a reprint of the last picture printed. Reprint requests are processed as shown in Figure I-4.

Figure I-4. Making a Reprint.





Glossary of terms

The following Glossary of Terms defines commonly-used computer graphics terms which are found in this book.

ADDITIVE COLOR SYSTEM: Same as the RGB Color System. Color system based on the behavior of colored light. This is the system by which color on a terminal screen is produced. Red, green and blue are the primary colors of an additive color system.

ADDRESSABILITY: Number of (horizontal by vertical) pixels displayable in a soft copy area (bit map), or printable on a hard copy (printed area). See resolution.

BIT MAP: The memory that holds the information about an image. It is the ordered pixel data about an entire image. The bit map is what is sent from the terminal to the printer. It may hold an ordered list of color indexes, or it may hold the raw RGB values as expressed in a color map.

BRIGHTNESS: The amount of light reflected from a colored surface. One of the characteristics of the hue-brightness-saturation color system.

BYTES: A byte is eight bits of data.

CGC (COPIER GAMMA CORRECTION): Copier Gamma Correction compensates for inaccuracies in the printed dot size and shape which result in discrepancies between the intended color (sent to the copier) and the actual printed color. Same as copier color correction.

CMY: See subtractive color system. CMY stands for cyan, magenta, and yellow.

COLOR CONVERSION: System of changing an expression of color in one color space to another (ie: RGB to CMY).

COLOR INDEX: A number which refers to one RGB value in a color map.

COLOR INVERSION: The process of switching one color for another on an image.

COLOR MAP: An ordered list of colors (expressed as relative amounts of RGB values) which are referenced by color index numbers.

COLOR MATCHING: The attempt to match a color on a CRT with that on a piece of paper (hardcopy).

COLOR PALETTE: The range of colors available for display (on a screen) or printing (on a printer).

COLOR SPACE: Color system such as CMY or RGB.

DIALOG AREA: On a Tektronix terminal this area displays information from the terminal's dialog memory or dialog buffer.

DIP SWITCH: Set of switches which must be set in a certain configuration to set up the electronics in an instrument for a defined application.

DITHER: The use of two or more colors to represent a color which cannot be printed directly with ink. The close proximity of the colors fools the eye into perceiving the unprintable color.

DPI: Dots per inch. A linear measurement used to express resolution.

DRIVER: Combination of software and hardware which transfers information from a terminal or host to a printer.

FRAME BUFFER: The memory which holds the bit map data in the printer before it is printed.

HUE: The color determined by the wavelength of light reflected from a surface. One of the characteristics of the hue-brightness-saturation color system.

HVC (HUE-VALUE-CHROMINANCE): A color space and a system for specifying a color. Its main benefit over other methods is that for equal changes in the coordinates, the eye will perceive equal changes in the color output.

IMAGE DATA: All the ordered pixel data for an image.

IMAGE POSITION: Refers to the orientation of an image on the printed media. See portrait and landscape.

IMAGE: Abstract term for the picture with no association with any display.

IMAGING: Process of converting a screen image to a printable image.

INTERFACE: Physical or logical connection between two devices in a system.

INTERPOLATION: Interpolation is a method of increasing the number of pixels in an image to increase the image size by fractional multiples (ie: 1.3, 2.6). Interpolation may generate lines that vary in width in the printed picture. See Replication.

LANDSCAPE: Orientation of an image on a hardcopy so that the bottom of an image is on the long axis of the media.

LAST PICTURE HOLDER: On the 4693D it is the memory holding the image data for the last picture printed.

MULTIPLEX: Hardware and software which allows more than one user to share access to a device.

NON-VOLATILE MEMORY: Memory which continues to retain data even when the device is turned off.

ORDERED PIXEL DATA: Pixel data grouped in a given order which comprises and defines the image data.

PARALLEL INTERFACE: A cable used for simultaneously transmitting bytes of data, eight bits at a time, as opposed to transmitting the data one bit at a time on a RS-232 serial interface.

PIXEL: A single unit of digital color image data. The smallest addressable piece of graphics information that the terminal or printer can display.

PIXEL ASPECT RATIO: Relative proportions of height to width of a rectangular pixel which determines its shape.

PORTRAIT: Orientation of an image on a hardcopy so that the bottom of an image is parallel to the short side of the media.

PROTOCOL: The logical rules for communicating between devices.

RASTER ELEMENT: Synonym for a pixel. Not a line of pixels.

RASTER IMAGE PROCESSOR: The interface and controller to a print engine which receives raster data from a source device and manipulates it for printing.

RASTER LINES: A single line of ordered pixel data. Terminals display these horizontal lines of pixels across the screen to form an image. A typical image is composed of several hundred raster lines.

RASTERIZING: Changing vector data (ie: PLOT 10, HPGL) to digital pixel data.

REPAINT: Multiple prints of the same image over the page, one on top of the other for brighter copies.

REPLICATION: Replication is a method of increasing the number of pixels in an image to increase the image size. Replication increases the size of an image by integer multiples only (ie: 2X, 3X). In this method the new pixel is assigned the same value as the replicated pixel. See Interpolation.

REPRINT: The printing of an image which has already been sent to the printer and printed once before. Reprint differs from multiple copies, because multiple copies are initiated with the first copy command, and reprints are initiated after the first copy command.

RESOLUTION: On a hard copy, resolution refers to the density, or number of printable pixels which the printer is capable of printing. On a screen it is the number of displayed pixels which can be displayed. Resolution is measured linearly and expressed in dpi (dots per inch) in or dpm (dots per mm).

RGB: Red, green, and blue video signals that a video display terminal or monitor uses to produce a color image on its screen. See additive color system.

RS-232: Standard serial interface.

SATURATION: The intensity of a color; how much color is present. Completely saturated color is its most intense. Completely desaturated color is gray. One of the characteristics of the Hue-Brightness-Saturation color system.

SCREEN COPY: Pixel by pixel transfer of screen image data to a printed copy. This results in a hardcopy print of the displayed screen image.

SERIAL INTERFACE: A cable which transfers data one bit at a time, as opposed to one byte at a time on the parallel interface. An RS-232 cable is a serial interface.

STATUS MESSAGES: Message which give information about the present state of a device.

SUBTRACTIVE COLOR: Color system based on the behavior of translucent substances when they are superimposed. This system is used in printing because ink acts subtractively. Same as the CMY color system. Primary colors in a subtractive color system are cyan, magenta, and yellow.

TRIPLET: An ordered group of three numbers which describes a color by position in some color space.

VECTOR: A straight line segment drawn between two points.

VECTOR DATA: Data based on geometric language (ie: lines, circles, polygons) rather than pixels, or points.

VIDEO GAMMA CORRECTION (VGC): Video Gamma Correction compensates for differences between the electrical stimulus put into a CRT and that of the actual light output from the CRT (what the eye perceives).

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Change information

Product: 4693D Color Image Printer

This manual supports the following versions of this product:
Serial numbers B010100 and up.

REV DATE	DESCRIPTION
January 1988	Original issue.
March 1988	Revised pages: Title page, iv, 2-18, A-3, A-21, B-27, C-2, G-2, G-3, and IDX-3.

